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USSR Report

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No. 67

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ELECTRIC POWER

ELECTRICAL EQUIPMENT INDUSTRY GOALS FOR 11TH FIVE-YEAR PLAN

Moscow EKONOMICHESKAYA GAZETA in Russian No 24, Jun 81 p 2

[Article: "The Development of the Electrical Equipment Industry"]

[Text] The electrical equipment industry entered the 11th Five-Year Plan as a large, highly developed sector of machine building. An important role in the electrification of the country belongs to it. This sector supplies diverse consumer goods.

During the years of the 10th Five-Year Plan the electrical equipment industry increased the output of products by 31 percent. At present more than 4,300 models of items have been recommended for the State Seal of Quality. The production of household appliances during 1976-1980 increased 1.5-fold, while their assortment was enlarged from 1,500 to 3,600 descriptions.

On the Basis of New Technology

The main task of the workers of the sector during the current 5-year period consists in the further improvement of the quality and the updating of products. During 1981-1985 the output of about 9,000 descriptions of new items has to be assimilated and at the same time more than 3,000 descriptions of obsolete products have to be removed from production at the enterprises of the Ministry of the Electrical Equipment Industry. According to preliminary estimates, such a large-scale updating of products and the increase of their technical level will provide a national economic impact of 7.5 billion rubles.

For thermal and nuclear electric power stations during the present 5-year period it is envisaged to increase considerably the output of generators with a capacity of 800,000-1,500,000 kW at the Elektrosila Production Association (Leningrad) and the Elektrotyazhmash Plant (Khar'kov). These generators will have a greater efficiency and a lower materials-output ratio.

The organization of the production of high voltage equipment for the superpower 1,500-kV direct current Ekibastuz-Center electric power transmission line and the 1,150-kV alternating current Ekibastuz-Urals electric power transmission line is a very important task in the area of electrical engineering. At present the sets of this unique equipment, which contains 64 types of different items, have been designed and included in the production plan of the enterprises of the Ministry of the Electrical Equipment Industry. Responsible tasks have been assigned to the

Zaporozhtransformator Production Association, the Middle Volga Transformator Production Association (Tol'yatti), the Elektroapparat Production Association (Leningrad) and the Moscow Electric Plant imeni Kuybyshev.

The reduction of the losses in the networks and the increase of the quality of electric power are of considerable importance for the effectiveness of electrification. A larger number of power capacitors is necessary for this. Steps are being taken to develop their production at the Kondensator Production Association (the head plant is in Serpukhov). However, mass output is being held up due to the inadequate delivery of new advanced materials by the enterprises of the chemical and pulp and paper industries and nonferrous metallurgy.

During this five-year plan the petroleum industry will receive electrical equipment with improved technical and economic characteristics, including submersible electric motors. Powerful and economical synchronous turbomotors for gas pumping stations have been developed and are being put into production at the Lys'va Turbogenerator Plant.

The workers of the electrical equipment industry are making their contribution to the development of coal mining. The miners will begin to receive more reliable, productive sets of electrical equipment, which will make it possible to increase by 1.5- to 2-fold the production of coal during stoping at the longwall.

It is planned to increase the output of equipment for pit excavators by 1.7-fold. At the same time the changeover to the complete supply of the necessary electrical equipment is being completed.

A 1.6-fold increase of the output of electric steel is envisaged in the country in the Main Directions of USSR Economic and Social Development for 1981-1985 and the Period to 1990. In this connection the electrical equipment industry has begun the assimilation of a new generation of steel furnaces with a capacity of 100-150 tons. Electroslag smelting furnaces with a capacity of 200 tons, plasma arc furnaces, which ensure the receipt of especially pure metals and alloys, units of powder metallurgy and other latest equipment are intended for our metallurgy.

It is planned to increase the complete deliveries of electrical equipment in a special agricultural design. They are necessary in processing and storing products, for controlling technological processes at livestock and poultry complexes, at hot houses and so on. In particular, the development of unitized control devices of electric drives at hog complexes, which are designed for 24,000 head of animals, is now being completed. The total output of electrical products for agriculture will increase during the 11th Five-Year Plan as against 1976-1980 by more than 1.5-fold.

The further technical progress and reequipment of rail transport in many ways depend on the Ministry of the Electrical Equipment Industry. It is necessary to increase the output and to develop new mainline electric locomotives, to standardize industrial electric locomotives and to furnish diesel engines with improved equipment.

A plant for producing electric transmissions for dump trucks with a carrying capacity of 75 to 180 tons is now being built in Naberezhnnye Chelny. The machine tool builders will receive not only more of the high torque AC motors they need, but also sets of electrical equipment with a combined system of numerical control, particularly with a fundamentally new electric drive for numerical control machine tools. Important tasks are also arising in the area of supplying all machine building sectors, the chemical industry and construction with complete sets of equipment and cable items.

The production of household electrical equipment should be raised to a new, higher level. It must not be forgotten that the demand of the population for voltaic cells, light bulbs, household lamps, juice squeezers, electric heating applicances and several other items is still not being fully met.

The sectorial comprehensive program of the development of the production of mass demand goods provides for a 1.4-fold increase of their output during the 11th Five-Year Plan. At the same time nearly two-thirds of the household electrical appliances should be produced with the State Seal of Quality.

National Economic Impact From Use of New Electrical Equipment Items (millions of rubles)

1970	1975	1980
403	934	1501

On the Way to Intensification

During the current 5-year period it is planned to increase the production volume of electrical products by a third. This entire increase should be obtained in practice with the same number of industrial personnel engaged directly in production and with a negligible increase of the consumption of metal, insulating, cable and other materials.

The practical solution of this problem is being achieved on the basis of the formulation and implementation of several comprehensive programs of saving--material, manpower, financial and other resources.

In these programs the updating of the processing method is in one of the first places. The certification of the level of the processing method and the organization of production has been introduced in the Ministry of the Electrical Equipment Industry. Here a rating of the object being certified is given, the appropriate organizational and technical measures are elaborated.

At present only 15.7 percent of the technological processes meet the requirements of the highest category, while more than 10 percent are liable to immediate replacement by new ones or to radical improvement. The proportion of technological processes of the highest category is especially low at the enterprises of the Soyuzelektroistochnik, Soyuzelektroizolyator, Soyuzelektrotransmash and Soyuzelektromash all-union industrial associations.

After analyzing the existing situation, the collegium of the ministry adopted a decision on the leading development of the technological services and subdivisions of the preparation of production. Standards of the number of such subdivisions have been established for all the links of the sector. It is proposed to take into account the technological level of production when forming and using incentive funds.

During 1981-1985 it is planned to introduce more than 1,000 flow and mechanized lines and more than 300 semi-automatic lines. The number of automated control systems of technological processes will increase to 60. Such systems are operating well at the Angarsk Electromechanical Plant and the Minsk Electrical Equipment Plant.

Such specific labor-consuming processes as winding, insulation and others are characteristic of the electrical equipment industry. In the sector its own machine building base, which ensures the mechanization and automation of such processes, is being developed. Plants for producing special technological equipment are already in operation in Novovolynsk, Zaporozh'ye and Minusinsk. A number of new plants are being built. The All-Union Scientific Research Institute of Electrical Machine and Apparatus Building (Khar'kov) and the VPTIelektro (Leningrad) are making their contribution to the mechanization of labor-consuming processes.

The task consists in consistently and persistently implementing in practice the drafted sectorial comprehensive programs. This will make it possible during the five-year plan to increase labor productivity by approximately 30 percent, to reduce the rates of consumption of rolled ferrous metals by 16 percent and of other materials by 11-20 percent. In the draft of the five-year plan of the development of the sector, which is now being drawn up, differentiated assignments are specified for each all-union industrial association, production association and plant.

While Improving the Mechanism of Management

As is known, the workers of the electrical equipment industry during the 1970's gained considerable experience in the planning and economic stimulation of technical progress. In this sector for the first time the certification of products by quality categories was organized and a system of the continuous (start-to-finish) planning of new technology on the basis of supply orders and of the financing of the development of new items by means of the unified fund of the development of science and technology was introduced. Funds for the economic stimulation of new technology subject to its efficiency were organized, a link was established between the size of the incentive funds, which are created for the achievement of the planned cost accounting results, and the fulfillment of assignments on the output of items of the highest quality category and so on. The results of the economic experiments in various sectors of industry, including the electrical equipment industry, were reflected in the measures on the improvement of the economic mechanism.

The initiative of the labor collectives in the competition for the increase of the efficiency and quality of work is increasing. The movement under the motto "Manual Labor on the Shoulders of Machines" is being expanded after the example of the Zaporozhtransformator Association. The initiative "To Each New Item the Seal of Quality" arose at the Leningrad Elektrosila Association. The operation of the combined system of the increase of the national economic impact of the output being produced is yielding high economic results at the Vatra Association imeni 60-letiya Sovetskoy Ukrainy.

The electrical equipment industry as a whole fulfilled the plan of 5 months of 1981 with respect to all the main technical and economic indicators. But some production associations and plants are still not fully meeting the contractual obligations, especially on deliveries of electric motors, cable items and batteries. The smoothness of the output of finished products is improving slowly. The machine shift coefficient is inadequate. Much metal is still ending up as scrap.

The Ministry of the Electrical Equipment Industry and the economic managers of the enterprises on the basis of the analysis of results of work in January-May should improve the use of all the internal reserves of production.

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ELECTRIC POWER

TIDAL ELECTRIC POWER STATIONS

Moscow GUDOK in Russian 23 May 81 p 4

[Interview with Doctor of Technical Sciences L. Bernshteyn, chief engineer of the designs of tidal electric power stations of the All-Union Scientific Research Institute of Planning of Hydroprojects imeni S. Ya. Zhuk, by NOVOSTI PRESS AGENCY correspondent Ye. Yegorov; place and date not specified: "On the Energy of the Tides"]

> [Text] Doctor of Technical Sciences L. Bernshteyn, chief engineer of the designs of tidal electric power stations of the All-Union Scientific Research Institute of Planning of Hydroprojects imeni S. Ya. Zhuk, answers the questions of NOVOSTI PRESS AGENCY correspondent Ye. Yegorov.

[Question] The possibilities of using the sun, the wind, the deep heat of the earth and the tides as sources of energy are attracting more and more the attention of specialists. What are the potentials [illegible] tidal power engineering?

[Answer] The tidal wave, the height of which in some places reaches 16 meters, runs up onto the ocean shore daily, regardless of the season of the year, at exactly the same time. The total energy potential of the tide, which can be used on the planet, amounts to several trillion kilowatt-hours a year. Of course, such an energy source should not be ignored. To build powerful tidal electric power stations (PES's) means to save hundreds of millions of tons of organic fuel.

[Question] The first tidal electric power stations--the Rance tidal electric power station in France and the Kislogubskaya PES in the USSR--went into operation at almost the same time in the late 1960's. Specialists have called the Kislogubskaya PES "the small station which gave rise to big hopes." What are the merits of this PES?

[Answer] The capacity of the Kislogubskaya PES is truly small: only 400 kilowatts. But it has become the prototype of the future tidal stations being designed in our country and abroad.

Our main contribution to world practice is the floating method of constructing PES's. The Kislogubskaya PES was constructed on shore--at a dock on Prityka Cape, near Murmansk, then was towed in finished form to Kislaya Bay of the Barents Sea, 100 kilometers from Murmansk. Here it was mounted on a base which was prepared in advance.

Since hydroelectric power stations had not been built anywhere in the world by this method, it was decided to construct an experimental small-capacity plant, and then to use the gained experience in the designs of other stations of larger capacity.

The French built their Rance right in place. But for this they first had to construct a cofferdam and to pump the water from the foundation pit of the future tidal electric power station. As a result the cost of one kilowatt of capacity was 2.5-fold greater than at a hydroelectric power station of comparable capacity. The copying of the traditional method of building hydroelectric power stations when constructing tidal stations was recognized as inefficient.

The experimental Kislogubskaya PES, which went into operation a year after the Rance, afforded opportunities for the considerable reduction of the cost of a tidal electric power station. For the need for expensive operations on the building of cofferdams and the draining of the foundation pit disappears in the case of the floating method of construction. Moreover, the station can be built in an inhabited region, and then towed to the site.

/Question/ The Kislogubskaya PES has been in operation for more than 12 years. Please say a few words about the experience of its operation.

/Answer/ Many years of experience and studies have confirmed the correctness and the promise of the decisions incorporated in the design of the Kislogubskaya PES. In particular, the thin-wall design of the building of the station successfully passed the dynamic and static tests under critical operating conditions. The strength and watertightness of the concrete were twice as great as the rated strength and watertightness. The settling of the building is uniform and has stabilized at 1 millimeter a year. Owing to cathode protection the equipment and the reinforcement of the reinforced concrete have not corroded.

/Question/ The Kislogubskaya PES so far is the only one in the country. What are the prospects of the development of tidal power engineering in the USSR?

/Answer/ The possibility of constructing PES's with a capacity up to 10 million kilowatts in the Mezen' Gulf of the White Sea has been demonstrated on the basis of the conducted studies. Here the eastern part of the water area of the gulf is being cut off by a dike 86 kilometers long.

The construction of a PES of the same capacity is possible in the Tugur Gulf of the Sea of Okhotsk. But even greater prospects are being revealed in another gulf of this sea--the Penzhino Gulf. If the entire Penzhino Gulf were spanned by a dike in the line of the Dal'nyy - Povorotnyy capes, a tidal station built here would have a capacity of 100 million kilowatts. The length of the dike would be 75 kilometers.

In order to construct such large tidal electric power stations, it is necessary first of all to solve several technical problems. One of them is connected with the construction of dikes many kilometers long. It is a very labor-consuming and expensive matter to build them by the traditional method. We have now, it seems, found a solution to this problem. Such dikes can be created by the detonation of a chain of concentrated charges which are located in deep bore holes. Their detonation will be designed so that it will raise the sea bottom to the necessary height and will form a dike. Here the cost of constructing the dike will be reduced to approximately one-tenth to one-twentieth as against the traditional means.

It is no less a difficult problem to obtain large capacities of PES's with the low head which the tide provides. Hundreds or even thousands of units will be required for this. A considerable decrease of their number can be achieved by enlarging the rotor of the hydraulic turbogenerator unit. The task of developing an encapsulated or direct current tidal unit with a greater unit capacity is arising.

It is difficult to build hundreds of giant floating blocks. The dimensions of some of them, for example, for the Penzhinskaya PES, are 85 meters by 58 meters at the base and 77 meters tall. As estimates show, 320 floating blocks will be needed for the Penzhinskaya PES. Of course, the mentioned problems are quite solvable technically.

When the first designs of PES's appeared, the opinions were voiced that their construction was "an expensive whim." Today it is obvious that tidal electric power stations are a quite practicable and, under the conditions of present-day power engineering, a very urgent matter.

But an intermediate stage is necessary for the transition from the small Kislogubskaya PES to superpower stations. Therefore the design of the Lumbovskaya PES with a capacity of 300,000 kilowatts, at which in the open air we hope to implement new decisions in the area of the construction of dikes and the development of large hydraulic turbogenerator units, is now being prepared. This tidal station on the White Sea can quite possibly be built by 1990.

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DAGESTAN-NORTH OSETIAN POWER LINE UNDER CONSTRUCTION

Moscow PRAVDA in Russian 3 Jun 81 p 1

/Article by V. Artemenko (Makhachkala-Ordzhonikidze): "Power Bridge in the Mountains"/

> /Text/ The main operations on the construction of the high-voltage electric power transmission line from the Chirkeyskaya GES, which is in Dagestan, to the capital of North Osetia have begun. The length of the new line is 214 kilometers. It will pass through the territory of three autonomous republics. With its placement into operation the enterprises and construction projects of the Northern Caucasus will receive additional power.

The new line will make it possible to utilize more completely the water resources of the Sulak Cascade of GES's. At the same time the reliability of the power supply of consumers will increase.

The route of the electric power transmission line began in the Dagestan settlement of Chir"yurt. Here the construction workers of the Order of the Red Banner Kavkazelektroset'stroy Trust of the USSR Ministry of Power and Electrification also set up their bases. They are performing work simultaneously on four sections by the forces of three mechanized columns. Recently the construction workers won the first labor victory--the 500th pylon was installed and the 100th kilometer of the electric power transmission line was connected up.

These kilometers did not come easily. The route is very difficult--three-fourths of it pass through mountains. It crosses the Terskiy and Sunzhenskiy ranges. But the people are doing their best, especially the brigades of installers of V. Odishelidze and O. Tkeshelashvili, as well as bulldozer operator R. Madanashvili and foreman G. Magradze. Many construction workers have mastered related occupations. The equipment is being used with a great impact.

The collective of the trust has assumed greater obligations: to put the electric power transmission line into operation a month ahead of the set deadline--by the current fall-winter peak of the loads at the power supply enterprises of the Northern Caucasus. The construction workers are striving to keep their word. But the vagueness of the actions of some supply organizations is preventing them from showing fully what they can do. Thus, the Soyuzelektroset'izolyatsiya Association has not delivered much line equipment, including in accordance with orders from last year. The Energokomplektatvomatika Trust is promising to ship protective panels and automatic machines only in the fourth quarter, yet the construction workers have needed them for a long time now. The Main Administration for Outfitting Electrical Equipment for Electric Power Stations, Substations and Networks has not allocated the capital for the delivery of control and power cables and wire for various purposes. The delay of the deliveries of equipment for the new electric power transmission line by the USSR Ministry of Power and Electrification and the USSR Ministry of the Electrical Equipment Industry is complicating the work of the construction workers.

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RURAL POWER OUTAGES, ELECTRICAL EQUIPMENT SERVICE

Moscow SEL'SKAYA ZHIZN' in Russian 6 Jun 81 p 2

/Article by Yu. Grachev (Kaluzhskaya Oblast): "Without High Voltage"/

/Text/ Once in the early spring in the third brigade of the Mayak Kolkhoz of Peremyshl'skiy Rayon the electric power was unexpectedly cut off. There was a break in the line. The livestock breeders sat through the entire day without light. The cows were unmilked and unwatered. The farm failed to receive 500 kg of milk. It is a considerable loss.

"They probably took action against the guilty parties," I inquire of Mikhail Fedorovich Palitov, chief power engineer of the kolkhoz.

"Nothing of the sort. The power supply organizations refund to the farms only the cost of the electric power not supplied, and then not in the full amount. But that is a minor point. They do not bear any responsibility for the products lost through their fault."

The case I was told about at the Mayak Kolkhoz is an ordinary thing which they have grown accustomed to and resign themselves to. Moreover, power outages, as a rule, are not even recorded at the majority of farms. And at times it is difficult to establish how many hours there was no light at one farm or another.

And if such data are suddenly necessary for the oblast report, they turn to the power supply organizations for them. That is, to those which are most often to blame for these outages. Everything is recorded there. It is known quite precisely, for example, that last year in Kaluga villages the electric power was cut off 91 times, as a result of which the farms failed to receive 50,115 kW of electric power.

As compared with the 500 million kW which are consumed annually by agriculture, this is a mere trifle. If, of course, you do not consider that behind them there are nontrivial losses, which amount to tons of milk, meat, eggs and other agricultural products.

Unfortunately, such an approach, which is not connected with the final agricultural product, is also characteristic of other departments which serve agriculture. Take, for example, the repair and maintenance of electrical equipment. Who should engage in it? Ideally, the associations of the State Committee for the Supply of

Production Equipment for Agriculture. But here is what Mikhail Grigor'yevich Kostryukov, chief engineer of the Borovskiy Rayon Administration of Agriculture, has to say about this.

"If a kolkhoz or sovkhoz does not have its own electric engineering service, no one will touch the electrical equipment. The exchange centers of the rayon Sel'khoztekhnika accept for repair only low-power motors. That is, what is a bit easier. But if, for example, the motor on a multiple-unit grain dryer has broken down, it is unbearable. They do not repair at all the equipment of units for the preparation of vitamin meal. But a very impressive electrical engineering filling exists there. Almost nowhere do they repair starters and protective equipment, deep-well electric pumps. It is impossible to speak of any planned maintenance of electrical equipment. At many farms it is without skilled care.

This is indeed the case. And what kind of care can it be a question of, if for the normal operation of electric-drive machines and machinery at the farms of Kaluzhskaya Oblast there are more than 500 too few electricians? There are only 22 electrical engineers at 172 kolkhozes and 87 engineers at 182 sovkhozes. Electrical engineering personnel are almost entirely lacking at a number of farms. Many manage with one or two electricians. Among them, for example, are the Kolkhoz imeni Kalinin of Yukhnovskiy Rayon, the Novyy trud Kolkhoz of Mosal'skiy Rayon and the Vernaya zhizn' Kolkhoz of Kuybyshevskiy Rayon, the Voroninskiy and Izvekovskiy sovkhozes and a number of others.

And how can there not be breakdowns, emergencies and accidents here? For even on the staffs of the rayon administrations of agriculture there is not one engineer of electrical engineering specialization. They say it is not prescribed according to the list of staff. In the oblast administration the department of mechanization had only one electric power engineer on the staff. He was recently dismissed.

In recent times something amiss has clearly happened with electrification in the village. The kilowatt is not working at full strength. But strictly speaking, technical progress in agriculture begins with electrification: without electricity it is impossible to milk and water the cows at the farm, to clean and dry grain on the threshing floor, to repair a combine or tractor.

For this reason electricity also requires closer attention, more skillful, reliable care. But then ask any electrician at one farm or another what he lacks for normal productive work. There are not enough of various small parts for the current repair of electrical equipment, there are no means of protection (nonconducting gloves and they are hard to get), plugs, sockets and ordinary bulbs. To say nothing about cable, wire and other scarce items. All of this is not to be had at the rayon Sel'khoztekhnika.

So, in order to somehow correct this situation, in Kaluzhskaya Oblast following the example of many other oblasts it was decided to set up in each rayon a Sel'khozenergo Interfarm Association. On a voluntary basis, of course. This organization is a purely cooperative one, which exists owing to the shares of the farms. It is believed that it will take charge of the monitoring of the power supply of kolkhozes and sovkhozes, the operation, repair and maintenance of electrical equipment and, with time, perhaps, also their supply with electrical materials and items.

Many kolkhozes and sovkhozes have already agreed to the organization of such associations. The first Sel'khozenergo Associations have appeared in Sukhinichskiy, Zhizdrinskiy, Maloyaroslavetskiy and Babyninskiy Rayons. However, in some rayons some people doubt the benefit of this matter. Among them is Hero of Socialist Labor Nikolay Fadeyevich Lyskin, director of the Vorsino Sovkhoz.

"Another association?" he says. "But will this not be the cause of the scattering of electrical engineering personnel, of whom there are never enough at the farms? Will this not divert materials and equipment from kolkhozes and sovkhozes? And there is another thing. Having gathered strength, will this organization not start to dictate its conditions to us, as some other associations often do?"

The apprehensions of the experienced farm executive can be understood. Indeed, in a number of places the new power organizations have not yet been able to influence effectively enough the development of rural power engineering. However, for the country as a whole they have proven themselves most favorably. The work experience of the Sel'khozenergo Association in Krasnodarskiy Kray, Volgogradskaya, Rostovskaya and Volgogradskaya Oblasts, Belorussia and other oblasts and republics attests to this.

Here it is a question of something else. In Kaluzhskaya Oblast there are not that many strong, economically developed farms as the Vorsino Sovkhoz. This highly mechanized farm annually uses for its own needs more than 6.5 million kWh of electric power. Here about 700 electric motors, 15 electric boilers, AVM-1.5 and SB-1.5 units, 2 granulators, several refrigerator plants, electric hot-water heaters at the farms and a large amount of other electrical equipment operate efficiently.

This entire substantial potential is in the care of the local technical engineering service, which is headed by Nikolay Vasil'yevich Bychkov, chief engineer of the sovkhoz. All the conditions have been created for the normal work of the electrical engineers at the sovkhoz. At each farm and complex there is a maintenance center, an electrical shop and a warehouse for electrical materials have been built. A sufficient number of electric motors, electric start-stop switches, cable, starters and other items and materials are always in stock here. The main electric engineering objects here are linked together, that is, they have a standby power supply.

But what is to be done by the other kolkhozes and sovkhozes, especially the ones which do not have such a substantial material and technical base, such influence and such connections? They alone, very likely, are not going to raise electrification to the proper level. Here one simply cannot do without the Sel'khozenergo Association. It is this organization which will help the workers of the village to strengthen the rayon engineering link of rural electric power engineering and will enable kolkhozes and sovkhozes to set up the efficient use of electrical equipment, its repair and maintenance.

7807
CSO: 1822/174

ELECTRIC POWER

DEVICE TO MEASURE QUALITY OF ELECTRICITY

Kiev RABOCHAYA GAZETA in Russian 16 May 81 p 2

[Article by V. Kroshka (Zhitomir): "A Reliable Controller"]

> [Text] All-Union State Standard 13109-67, which should standardize the parameters of the quality of electric power, has existed in our country for nearly 15 years, but is not being used in practice. There is one reason for it--the lack of control and measuring equipment. And now the "blank" has finally been eliminated. The decision of the state committee on the acceptance for series production of the Kachestvo measuring and computing system, which is designed precisely for the comprehensive determination of all seven indicators of the quality of electric power and the mathematical processing of the results of the measurements, has been approved in the All-Union Electric Measuring Devices Production Association.

This event was not an ordinary one, it had been expected for a long time. The word "system" characterizes in full the equipment which was developed by the collectives of the Zhitomir Elektroizmeritel' Production Association and the Institute of Electrodynamics of the Ukrainian SSR Academy of Sciences to the order of the USSR Ministry of Power and Electrification. The Kachestvo is several frames filled with electronic equipment. There are here a measuring unit and a microcomputer, the memory of which will contain 16,000 commands, a tape puncher, an automatic chart maker, a digit-printing device. The nine main units, which are interconnected in a single package, take measurements, compare the obtained data with the standard current and put out the resulting information--the numerical and graphic parameters of the quality of electric power. The system can make one-time measurements of any one specific parameter and can operate in a preset automatic mode. For example, it can measure and record the graphic fluctuations of the voltage of a single-phase or three-phase electric current every 20 minutes or with any other interval during the day.

There are other essential details. The Kachestvo is the first special-purpose, narrowly specialized measuring and computing system. It has no analogues either in the USSR or abroad.

Interested specialists: representatives of the USSR Ministry of Power and Electrification and the USSR State Committee for Standards and leading scientists of many specialized scientific research institutes of the country, have examined the first-ling in every respect. The notice "State tests under way" hung for nearly a month on the doors of one of the many plant laboratories.

A design engineer and programmer are at the operator's panel. The command is given:

"Operational mode!"

The operator switches a number of tumbler switches. The photoelectric reader here turns out a continuous lighted track of figures. The device, which outwardly is reminiscent of an ordinary typewriter, pours out a fraction. The obtained numerical data are an exhaustive description of the quality of the current, which is being fed into the network of the head enterprise of the association. The Zhitomir power engineers do not even suspect that at this moment the quality of their work is being monitored with respect to all possible parameters. It is being monitored for the first time in production practice!

"The deviation of the current is 10 percent, the fluctuations are above the norm," the operator states.

One of the commission members lets out the remark:

"You would not award the Seal of Quality to such 'raw material.' The current is heading for the third quality."

Electric power is also a commodity. Only it is not delivered to a warehouse of finished products, but immediately goes to the consumer. There is another essential difference--it is impossible to reject low quality electric power, to remove it from circulation or return it for modification. For example, all electric equipment is design to operate at certain parameters, and if a current of a high voltage is fed to it, it will break down. An iron or a light bulb will suddenly burn out, a television will break down prematurely. In case of a decrease of the voltage, as studies show, the productivity of some industrial electric furnaces decreases by 12 percent and that of electrolytic cells for the production of aluminum decreases by 10 percent. The expert estimates, according to which the losses from the low quality of current on the scale of the country are about 2 billion rubles, are well known. Therefore the urgent demand to install control and measuring equipment for checking the quality of electric power and preventing its rejection is becoming even more obvious.

Both those who will very soon be operating the Kachestvo and the scientists who are members of the state commission express a high opinion of the system and its authors.

"The use of the Kachestvo," said state commission member Doctor of Technical Sciences A. K. Shidlovskiy, director of the Institute of Electrodynamics of the Ukrainian SSR Academy of Sciences, "affords the opportunity for the efficient control of the operating conditions in power systems for maintaining the necessary parameters of the quality of the current and, in the end, makes it possible to apply the proper state standard. Kachestvo systems should be installed first of all at powerful substations and power-consuming enterprises."

7807
CSO: 1822/174

TRANSCAUCASIAN POWER SYSTEM ASU GOES INTO OPERATION

Tbilisi KOMUNISTI in Georgian 19 Mar 81 p 1

[Article by Transcaucasian Power Systems Unified Dispatcher Administration Head K. Petriashvili: "Lever of Economic Effectiveness"]

[Text] Phase 2 of the Transcaucasian Unified Power Systems ASU [automatic control system] has gone into operation. A great deal of labor-intensive organizational-technical and scientific work went into the adoption and startup of its hardware, software, and data base.

A Transcaucasian Unified Power System includes the Georgian, Armenian, and Azerbaijan power systems, which are connected to the USSR Unified Power System.

The operation is run by the Unified Dispatcher Administration, which has set up a big computer center and a data gathering and display system.

The computers that make up the operational data complex operate in real time synchronously with a technological process and provide for the reception of teledata and the building of data banks whose recording and screening are essential for analyzing the system's current operations, also the display of structural charts and reference data when personnel so request.

An automatic redundancy system has been built in with switchable input and output devices, with the option of drive and slave machines. This arrangement practically rules out disruptions in the work of the operational-data complex. In addition, the computers of the operational-data complex are connected to the computer complex equipment, making it possible to carry out operational computations on the basis of current telemetry for optimal system performance.

The appropriate software has been worked out for the operational complex. It not only provides for carrying out the above functions but also direct display dialog with the data user's control panel.

The computer complex consists of four computers and carries out the following tasks: optimal planning of the unified power system's current and long term operating regimes and repairs to the basic installations, analysis of the operating regime, and processing of statistical production data.

At present, the system makes regular use of about 65 types of task programs. Prominent among them are the optimalization tasks. The administration's collective is doing a great deal along these lines to adopt programs worked out by the various scientific-research institutes and to work out new methods and programs on their own. The resolution of just this kind of task yields the greatest economic effectiveness in the functioning of the ASU.

Also worth noting is another kind of work, which was carried out for the first time in the power sector by our administration. This is the "simulator" task, worked out by the V. I. Lenin Polytechnical Institute at our request. The "simulator" is designed for the training of operations personnel. It enables the system's dispatcher to work out and model control problems for various anticipated situations.

This is, therefore, the first multi-computer complex with an elaborated network of terminals to be installed in Transcaucasia.

6854
CSO: 1813/062

ELECTRIC POWER

BRIEFS

WIND ELECTRIC POWER STATIONS--Arkhangel'sk, 6 May--The Arctic coast is a region of perpetual winds. The specialists of the Pechora Fish Processing Combine imeni 50-letiya Oktyabrya have decided to use their strong force for the generation of electric power at distant camps. The first wind generator was installed at the fish receiving center of Farikh. The wind electric power plant is small, but the economic impact from it is great: 8 tons of fuel, the delivery of which to the Arctic is extremely difficult, are saved in a year. Just one worker attends the windmill. Recently a wind generator also began to turn at Dresvyanko. Such stations are also being installed at other remote posts. [By N. Golitsyn] [Text] [Moscow PRAVDA in Russian 7 May 81 p 6] 7807

COMBINED NUCLEAR-HYDRAULIC STATION--Khar'kov, 2 April (TASS)--Scientists of Khar'kov have proposed to make the same stream of water "combine jobs"--to cool atomic units and to turn the blades of turbines. They have drawn up the engineering design of the first combined power complex in the country on the Southern Bug River. A large nuclear electric, hydroelectric and pumped-storage station will be united in it. Such a combination makes it possible to shift large reserves of electric power most effectively and to decrease sharply the expenditures on the construction of production structures. The total capacity of the future power giant will be 6.2 million kW. Its main object--the Yuzhno-Ukrainskaya AES--is already being built. The specialists of the Ukrainian Scientific Research Institute of Planning of Hydraulic Projects have acquainted themselves with the sketches of the complex, which give an idea of the unusual technological circulation of the water. While continuously flowing over the condensers of the turbines, which have been heated by the nuclear fuel, they cool them to the necessary temperature. The used clean and warm water enters a common reservoir and here cools off "on the move," as it is discharged onto the blades of the hydraulic turbines. With a minimum size of the artificial lake it is possible to increase appreciably the total capacity of the complex. Reversible generator-motors, which are capable of operating in two modes, will operate in a single team with the other equipment. During the peak hours they will generate an industrial current, while at night, when the consumption of electricity decreases, they will be able, like pumps, to pump water into the upper storage pond. The head of the stream being discharged from here will be used at the necessary time for generating additional power. [Text] [Moscow PRAVDA in Russian 3 Apr 81 p 2] 7807

CSO: 1822/175

ARCTIC GAS-FIELD WORKERS CRITICIZE WASTE OF THEIR PRODUCT

Moscow IZVESTIYA in Russian 16 Apr 81 p 2

[Letter to IZVESTIYA by B. Zakharenkov, Urengoygazdobycha [Urengoy Gas Recovery Production Association] operator; A. Bezrukavyy, Arctic Deep-Drilling Expedition drilling foreman; A. Arazberdyyev, foreman of the Medvezh'ye Oilfield Administration of Nadymgazprom [Nadym Gas-Industry Production Association] and R. Sayfulin, senior engineer of Tyumengazprom [Tyumen' All-Union Gas Industry Production Association] (Tyumenskaya Oblast): "An Economic Accounting for Natural Gas," and commentary thereon by A. Kolotilin, chief of the Main Administration of the State Gas Inspectorate of Mingazprom [Ministry of Gas Industry]]

[Text] The Economy Should Be Economical.

We are working in the frigid tundra: we are drilling over the Urengoy and Medvezh'ye gas deposits, and at the field installations we are preparing the blue fuel for delivery to the Urals and to the country's central regions. We sink wells under the complicated conditions of permafrost.

The work at the oilfield installations and compressor stations is complicated. Round about are automation and remote-control equipment, but man is in no way replaced. During the winter the operators often go out onto the tundra to warm up the circuits over which gas from the wells arrives at the oilfield facilities. In brief, it is not easy to obtain arctic gas.

But we are doing everything possible to ensure that the national economy will obtain it in adequate amounts. During the 10th Five-Year Plan the All-Union industrial association Tyumengazprom recovered 446.7 billion m^3 of fuel. This is almost five times as much as during the preceding five-year plan. Right now every third cubic meter of gas recovered in the country is from Tyumen'. Our gas-field facilities provide practically for the industry's entire growth in recovery. Comrade L. I. Brezhnev's December 1980 greetings to the gas-field workers, builders and all personnel engaged in work to develop the oil and gas industry of Tyumenskaya Oblast stimulated great labor enthusiasm in all of us.

Much is being done in the drilling expeditions and at the gas-field facilities to reduce the prime cost of the gas. For the first time in world experience, large-diameter wells of increased reliability were built, and cluster drilling and the modular outfitting method of erecting gas-field facilities were introduced in a permafrost environment. The high flow of the wells at Medvezh'ye and Urengoy enable up to 300,000 rubles to be saved at each well per year. While rigs with an annual productivity of 7.5 billion m^3 were constructed at first at Medvezh'ye, those at Urengoy and Vyngapur now have twice that capacity.

The Tyumen' gas complex is a large and complicated activity. We are operating four fields, there are some 15 field facilities in the arctic tundra, and hundreds of wells feed them. A high-capacity trunk pipeline system has been created in the oblast. Its total length is almost 10,500 km, and its throughput is 150 billion m^3 of gas per year.

In accordance with 26th CPSU Congress decisions, the share of Siberian gas in nationwide recovery will be from 33.2 to 53.8 percent. For this purpose, hundreds of wells must be drilled and hooked up and a thousand kilometers of service lines extended to them, and new facilities for the integrated treatment of gas and condensate and thousands of kilometers of trunk pipelines with compressor stations having a total power of 6 million kw will be built. Daily recovery in 1985 will exceed 1 billion m^3 of natural gas--as much as is now being recovered by Mingazprom as a whole.

The prospects are encouraging. Today Tyumen' has become the country's chief base for supplying the economy with fuel and energy resources. But this does not at all mean that we can consume it thoughtlessly. It is no secret that fuel, water, heat and other resources are still being expended extravagantly at some enterprises. We are trying to guard each cubic meter of gas recovered, but here and there something that is obtained at a very high price is being squandered thoughtlessly.

It is pleasant for us, of course, to have our participation in great affairs recognized. But it is important not only to recover the gas but also to put it to use sensibly and with solicitude. When you hear or read reports about the successes of the gas industry, millions and billions of cubic meters of "inexpensive fuel" are often mentioned. To the uninitiated the notion arises that gas is very easily obtained for fuel or raw-materials use. They say, open the valve and burn as much as you like. Is this not why the proper monitoring over operation of gas-consuming units at some enterprises and municipal boilerhouses is absent?

We will not go far for examples. Last year we visited Tyumen' for an oblast conference, and in the evening we decided to take a walk about the city. We say it frankly, the picture obtained was not a pleasant one. On many streets steam was escaping from the ground, as if we had come to a valley of geysers on Kamchatka. These malfunctioning steam lines were "heating the air." It follows that northern gas was being burned in vain at the Tyumenskaya TETs! It was bitter to the soul to recognize that such a negligent and extravagant attitude toward national property existed.

The current winter in West Siberia turned out to be warm. In each apartment the small hinged ventilation panes were open all day. Because it was hot inside, but don't touch the radiators. Yet geologists, drillers and operators have to go ever farther into the depths of the taiga, swamps and tundra in search of new deposits of the so-called cheap fuel. Each year a cubic meter of gas costs more. And the cost of sinking a meter of hole has risen recently.

Therefore we appeal to all natural gas users: let us take a thrifty attitude toward society's property as the heart of all our work. Let us respond to the historic decisions of the 26th CPSU Congress in a businesslike manner.

B. Zakharenkov, operator of Urengoygazdobycha Association; A. Bezrukavyy, drilling foreman of the Arctic Deep-Drilling Expedition; A. Arazberdyyev, foreman of the Medvezh'ye Oilfield Administration of the Nadymgazprom Association; and R. Sayfulin, senior engineer of the All-Union association Tyumengazprom.

Tyumenskaya Oblast

At the request of the editorial board, A. Kolotilin, chief of the Main Administration of the State Gas Inspectorate of USSR Mingazprom, has commented on the letter of the Tyumen' gas-recovery workers.

The letter from Tyumen' to the newspaper IZVESTIYA has posed correctly the question of the necessity for saving fuel and power resources in every possible way. It is natural that this problem is disturbing to gas-recovery workers in that region, where the largest natural gas deposit are located. During the 11th Five-Year Plan practically all the growth in nationwide recovery of gas will be provided precisely by Tyumenskaya Oblast.

The situation is this: the main gas deposits are concentrated in the North, but the main gas consumers are in the European part of the country. This foreordains complexity in transport: the gas has to be moved over great distances, and thousands of kilometers of pipelines have to be built, costing billions of rubles in capital investment.

Comrade L. I. Brezhnev noted in his report at the 26th CPSU Congress that right now the heart of economic policy is a thrifty attitude toward social property and skill in using everything that we have with completeness and purposefully. Are all of us doing this?

I recently went about the regions of the northern gas deposits. There a special commission chose the most economical route for a future system of gas trunk pipelines. This is a fundamental question in the expenditure of material resources and capital investment. Their amount should be what is necessary and adequate. No more and no less.

However, it would be unrealistic to think that the national economy's growing demands for gas can be satisfied just by increasing gas recovery. This problem must be resolved in integrated fashion: improve the organization of gas utilization simultaneously with the increase in recovery.

Organs of the State Gas Inspectorate have recently surveyed 14,000 enterprises. It was found that nonproductive gas consumption reaches 6-8 percent of total annual consumption, or about 15 billion m^3 per year for the country as a whole.

Two main factors can be singled out for the nonrational use of gas.

First of all is the matter of the equipment. Thus, the serial output of industrial furnaces has not been arranged. Therefore, specific gas consumption in many industrial processes is considerably higher than is required at the modern level of production. Minelektrotekhprom [Ministry of Electrical Equipment Industry] several years ago was charged with organizing the output of industrial gas furnaces, but this problem still has not been resolved. And right now, the specific fuel consumption of furnaces for heating metal for forging and stamping at machinebuilding ministry enterprises is 3-fold that of similar imported equipment.

Ineffective gas-using installations are still being used. They are equipped with uneconomical burners and do not have recovery boilers, automation of combustion-process regulation, or instruments for monitoring and recording.

A second factor is unsatisfactory operation of the equipment available. Work to set up operating regimes is done unsystematically and irregularly.

The total loss of gas to these causes alone at the enterprises surveyed in 1980 was 4.2 billion m^3 per year, according to an assessment by USSR Gosgaznadzor organs. Great losses are suffered at enterprises of USSR Minneftekhimprom [Ministry of Petroleum Refining and Petrochemical Industry], Minavtoprom [Ministry of Automotive Industry], USSR Minlesbumprom [Ministry of Forestry Products and Paper Industry], Mintyazhmash [Ministry of Heavy and Transport Machinebuilding] and a number of other ministries. The matter of using gas is going especially poorly at central-heating boilerhouses of Union republic ministries of housing and municipal services, where up to 1.9 billion m^3 are lost each year.

The solution of the first problem (a rise in the technical level of the equipment) requires substantial capital investment. But in order to solve the second problem (optimum operation of existing equipment), no additional expenditures are, in essence, necessary. It requires something else--increases in the responsibility of the user and precision in organization of the matter. It is this that will enable the actual efficiency factor of the units to be raised.

There are scandalous examples of wastefulness. The Novocherkassk Experimental Plant for Silicate Materials acquired a modern DKVR-6.5/13 boiler unit several years ago. It was put on an open platform and still has not been installed. Modern equipment that is needed is unavoidably and inevitably brought to unsuitability. In this case, the plant continues to use obsolete, worn units. Each year up to 20 percent of the gas consumed is discharged through the pipes. The Ministry of Gas Industry last year raised the question about this plant to USSR Minstroymaterialov [Ministry of Construction Materials Industry] managers. Until now the situation has not changed.

More than half of Minkhimmash [Ministry of Chemical and Petroleum Machine Building] and Mintyazhmash enterprises operate without a tuneup. This means they bring in a boiler, install it and begin to produce output without being concerned about the effectiveness of its operation.

Tyumengazprom's workers noted truthfully in their letter that major losses of heat are being tolerated because of wasteful operation of heating networks. It must be said that right now, in essence, it is difficult even to say how great these losses are, to determine their amounts with adequate precision. Many enterprises have no instruments for reporting the use of thermal energy. They numbered about 40 percent of the enterprises surveyed. The most unfavorable situation prevailed in the central heating boilerhouses of the ministries of housing and municipal services of the Union republics. Although these enterprises are specialized in supplying heat, it is they who are worst of all in the matter of accounting for heat--it has not been arranged for in 80 percent of the boilerhouses.

According to the data of a check that was made in 1980, every third enterprise of USSR Minneftekhimprom, Minavtoprom, and Minenergomash [Ministry of Power Machine Building] had no units for recovery of the heat of the combustion products of the gas. A third of the enterprises did not tune up the automatic regulation of the combustion processes. Specific gas consumption norms at every fifth enterprise checked did not correspond to the specifications of the equipment installed.

Concrete examples can be cited of the wasteful use of gas. Matters go poorly, let's say, at the Groznyy Oil Refinery imeni Lenin of USSR Minneftekhimprom. Since 1979 only one heat-recovery boiler has been operated at the ELOU-AVT [electrical atmospheric-vacuum pipestill desalination installation] here, and then only for half of the load. But two boilers had been planned for here. The gas-combustion process has not been automated, burning occurs with an exaggerated excess air ratio. All this leads to annual losses of 10 percent of total gas consumption. This is more than 12 million m^3 per year.

Meanwhile, there are many enterprises that the others should compete with. Primarily the Magnitogorsk Metallurgical Combine, the Cherepovets and Donets metallurgical plants, Severodonetsk's Azot production association, the Rostov GPZ-10 [Gas Treatment Plant No 10], the Tashkent Paper Combine and other enterprises.

A multifaceted set of measures is planned for savings and economies of fuel during the 11th Five-Year Plan. Realizing it will allow savings of 160-170 million tons of standard fuel equivalent. Fulfillment of the set of measures planned also will require definite expenditures. However, these are profitable outlays. Economists estimate that they will require half as much funding as the corresponding increase in the recovery and delivery of fuel to consumers.

Yes, restructuring will require major efforts and it will not be cheap. But it is necessary, and it is cheaper to organize this than to uneconomically expend the "blue gold"--a natural treasure which can in no way be replenished. Gas is our national wealth, and a thrifty attitude toward it is the patriotic duty of all laboring collectives, each family, and each citizen.

11408
CSO: 1822/151

ENERGY CONSERVATION

OIL REUSE IMPROVES IN BSSR, BUT MORE CAN BE DONE

Minsk SOVETSKAYA BELORUSSIYA in Russian 8 May 81 p 2

[Article by A. Pimenov, senior engineer of GSSR Goskomnefteprodukta [State Committee for Petroleum Products]: "Neglected Petroleum Products"]

[Text] The Economy Should Be Economical.

My job often requires me to check on how industrial enterprises are using spent petroleum product. With the creation in 1977 under BSSR Goskomnefteprodukta of a special department that answers for the collection and saving of oil, this work has improved considerably. During the past 4 years, for example, almost 137,000 tons of spent petroleum product were collected, double the amount collected during the preceding five-year period (1972-1976). These oils have been used successfully in a secondary process: as boiler fuel (or a component of it), for industrial needs, or for reclamation. The secondary use of spent oil has brought substantial savings to the national economy.

At the same time, many economic workers view spent oil not as an industrial raw material but as...production waste. The consequences of such an attitude are extremely unfortunate. For example, reclamation installations are inactive or are entirely absent at the Brest Gas Apparatus Plant, the Grodno and Mogilev synthetic fiber plants, the Mogilev Elevator-Manufacturing Plant, the Pinsk Castings-Equipment Plant, the Beloruskaliy and Tekhosnastka production associations, and many other organizations. For this reason, beginning in 1977, capacity for processing 7,600 tons of petroleum product with single-shift operation has not been used.

Poor operation of the units also is telling. Thus in 3 years 1,600 tons of oil at the Minsk Motor Vehicle Plant and a large amount at the Minsk Tractor Plant were not processed for this reason. This listing could continue. Suffice it to say that at present only 13.8 percent of all spent petroleum product is being reclaimed at the enterprises' units. But the annual saving from the operation of, let's say, an RTM-200 unit, is 48,600 rubles. Enterprise managers, of course, cannot help but know this. Nevertheless, some economic workers, having the necessary equipment at their disposal (in Beloruskaliy, for example, a reclamation installation has not been operating for 15 years), prefer to turn the "waste" over to an oil refinery, caring little about the transport outlays and the shortage of tank cars.

Why does this occur? First, because the currently existing economic levers are poorly conducive to effective operation. In our view, for purposes of more complete use of reclamation installations, it is necessary to apportion funds for fresh oil to take the existing equipment into account. In other words, to tighten up norm-setting and thereby compel enterprises to bring existing reserves into operation.

The repeat use of spent petroleum product that goes to industrial needs and to boiler fuel deserves special comment. For this purpose, each enterprise is required, first of all, to determine the specific industrial processes where the waste can be used. However, checks indicate that even at the first step, supervisors are not concerned about these questions. Thus, the collective of the Svetlogorsk Reinforced-Concrete Products and Structure Plant uses 482 tons of petroleum product for its industrial needs, and 185 tons of this amount is fresh raw material obtained from the Berdyansk and Baku oil refineries. Specialists have estimated that 3,900 rubles could be saved at this plant alone by converting from unused to spent petroleum product. I will note that expenditures for haulage are not included in the expenditures. In this case, the spent raw material can be used at republic bulk plants instead of being hauled from Baku or Berdyansk.

The cause, as I have already said, is hidden in the fact that, encouraged by a lack of close monitoring and the imperfection of current accounting, enterprises take a slipshod attitude toward the secondary use and collecting of oil, and they artificially inflate the bookkeeping in their own parochial interests. Thus, of 765 customers for petroleum product, not one has been provided fully today with the technical standards documentation. As a rule, accounting for the movement of spent petroleum product has not been organized at enterprises, there is no schedule for changing oil, various production subunits have no plans for collecting it, and no one person has been designated responsible for the rational use of petroleum product. Take just this example. Cuttings covered with oil are not being utilized at many plants, and up to 30 percent of valuable waste is lost this way.

Investigations indicate that many supervisors take an irresponsible attitude toward working out organizational and technical measures. Thus the production association of the Minsk Tractor Plant imeni V. I. Lenin made up measures in 1977 that did not touch on even one of the questions raised. Repeat checks in 1979 and 1980 showed that here, as before, there was a negligent attitude toward saving petroleum product. Belenergoremnaladka, the Minsk Instruments Plant, the Minsk Production Association for Building Materials, the Grodno Propeller Shaft Plant, and many other facilities prepared measures only as a formality.

All this indicates that the rational expenditure of spent petroleum product has escaped the attention of managers of enterprises, ministries and agencies. Local party organs, executive committees and people's control organs are monitoring this matter poorly. Of course, there are also errors by BSSR Goskomnefteprodukta. I want only to emphasize that our one department alone cannot cope with this task. I think that the time has come to require that spent petroleum product be saved just as strictly as metal is saved.

A solicitous attitude toward social property and skill in making full and sensible use on the job of everything we have should become the law for each collective and each manager.

11409
CSO: 1822/151

OPPORTUNITIES TO SAVE ELECTRICITY IN AZERBAIJAN POINTED OUT

Baku BAKINSKIY RABOCHIY in Russian 10 Apr 81 p 2

[Article by N. Safarov, chief of power inspection of Energonadzor [State Inspectorate for Industrial Power Engineering and for Power-Engineering Supervision] of the republic's Azglavenergo [Main Power-Engineering Administration of the Azerbaijan SSR]: "Energy--Savings and Losses"]

[Text] The Economy Should Be Economical.

> Electric-power engineering in our republic should be raised to a much higher level during the 11th Five-Year Plan, thanks mainly to an increase in the power-engineering potential and the introduction into operation of large power stations, among which primarily the Shamkhorskaya GES and the Azerbaydzhanskaya GRES should be named. However, as was stressed at the 30th Congress of the Azerbaijan Communist Party, supplying the republic's economy with energy these days still lags behind the rising demand, and this is a serious problem.
>
> There are many unsolved problems in industry and agriculture in the matter of the rational use of electricity, and cases of wastefulness and a negligent approach to consuming it are outmoded.
>
> BAKINSKIY RABOCHIY recently published a letter from workers, engineers and specialists of Baku's Elektrotsentrolit plant. They appealed to all workers of the republic's economy with the call: "Each collective must consider thriftiness." Today, in publishing an article by N. Savarov, chief of power inspection of Energonadzor, BAKINSKIY RABOCHIY continues the discussion about ways to make the economy economical, as Comrade L. I. Brezhnev pointed out at the 26th CPSU Congress.

Last year the republic's economy saved more than 160 million kw-hr, and more than 40 million kw-hr were saved during the first quarter of this year. Previously, discussion of the question of observing the savings regime was usually restricted to such data. Now there are stricter criteria for evaluation. And here we should state that the level achieved is clearly inadequate. The republic's industry and agriculture are not as a whole coping with tasks to reduce the consumption of electricity. Last year the achieved indicator proved to be little more than half that planned, and there are no radical changes even now.

Such a situation cannot help but cause alarm. During the 11th Five-Year Plan intensified programs for saving power resources are to be carried out, and the 26th party congress directed the attention of the national economy's workers toward this. To the fact that it is an objective necessity. It is known that power engineering's development pace is slower than that of industrial production. Consequently, as Comrade L. I. Brezhnev pointed out, in order to avoid an excessive increase in capital investment, resources must be used more rationally, and there must be savings of them during consumption.

And the experience of collectives that have implemented thrift regimes is extremely important here. A leading place in the competition to save power is constantly held by the collective of the NGDU [Oil and Gas Recovery Administration] imeni Narimanov. Here a major set of organizational and technical measures has been executed, thanks to which the administration's oilfield workers have been able to greatly reduce power consumption in comparison with the goal. Unfortunately, not many industrialized enterprise collectives have managed to do so. The NGDU imeni Narimanov has rebuilt a pump station, installed electric motors of lesser power in many places without violating operating-process specifications, and some wells have been converted to the less power-intensive gaslift method of recovery. Rhythmic production work, a persistent drive against losses and the wide introduction of rationalizers' suggestions have enabled Organicheskiy Sintez Association collective successes in the matter of saving energy resources. The Baku Oil Refinery imeni 22d Party Congress is doing much work to improve the process flow scheme, to make more complete use of existing capacity, to centralize the power supply and, in accordance with this, to replace obsolete small-powered installations.

The savings experience of these enterprises' collectives, it goes without saying, requires dissemination. And now another aspect of the problem will be discussed--where electric-power losses can be avoided. Unless errors are analyzed, a radical break in the matter of saving power cannot be made. Analyses start with the first stage--with planning. It is necessary to get rid of the practice whereby we, Energonadzor workers, often have to require reviews of the scope of the planned measures, since the enterprises cannot effect the required savings without them. But apparently even we have not avoided errors. The inadequate level of saving of energy resources testifies to this.

It would seem that the question of planning must be put more broadly. The situation under which the overwhelming majority of enterprises provide for only a third of the savings of electric power through basic measures and achieve two-thirds of the savings through additional measures can hardly be allowed to exist any longer. The decisions of the 26th CPSU Congress require that enterprise managers adopt a basically different policy. They emphasized that both engineering policy and the system of plan and reporting indicators will be determining in saving energy resources. Everything that is done in this area should be rigidly fixed in the plans and become a first-priority concern for each collective.

And, finally, one cannot be reconciled to the fact that some enterprises want to live "with old baggage" and do not search broadly for reserves for saving energy resources. Here it is necessary to speak, above all, about the intolerability of using equipment that is obsolete or not adapted to current electrical consumption norms. In the reporting, everything looks smooth when such equipment is used, and the enterprise collective proves to be nearly among the leaders. That is to say, the thrift regime is on paper. Such a situation was observed at the Peschanaya MUBR [Offshore Drilling Administration] of Kaspmorneftegazprom [Caspian Sea Oil and Gas Industry Production Association], the Sumgait Plant for Detergents, the Agdam Building-Materials Combine, and the fats-and oils combine and the breads and pastries production association in Kirovabad.

It goes without saying that excessive consumption of electricity imposes a heavy burden on the overall indicators of some of the republic's enterprises. Last year 30 enterprises overexpended 47 million kw-hr of electricity. In other words, almost a third of the amount that had been saved by the republic's industry as a whole was lost.

Substantial miscalculations were characteristic here for the Azerbaijan Railroad, the Gobustan Exploratory Drilling Administration, Azerneftemashremont [Azerbaijan Association for the Repair of Oil-Industry Machinery] plants and some other enterprises. They resulted from a lag in carrying out tasks, idle time, violations of the savings regime, and weak organization of educational work in collectives.

Since the start of last year the railroaders have overexpended more than 20 million kw-hr of electricity. Moreover, substantial reserves for saving electricity have proved to be unused. According to Energonadzor data, by reducing the number of runs by trains of empties, increasing the number of heavily loaded trains, and returning a portion of the electricity to the network, 11 million kw-hr could be saved per year. Mainly because of accidents, Gobustan drillers have lost up to 15 percent of the electric power. Obsolete compressors are operating at Krasnyy Proletariy plant and the Plant imeni Ordzhonikidze of Azerneftemashremont and, in those sections where they have been installed, industrial discipline often is violated. Because of this alone the association loses annually more than 200,000 kw-hr of electricity.

The surprise and regular inspections that Energonadzor inspectors make have found a number of violations of the thrift regime, to which, unfortunately, the enterprises get accustomed. More than 1 million kw-hr of electricity are consumed in vain at the NGDU imeni 26 Bakinskiye Komissary because the pumping units there are not regulated, much process water leaks out, and the cleanout of mains and pipelines and of petroleum-product sedimentation is not done in good time. Sumgait industry losses are just as great through the fault of collectives of two enterprises alone: at the superphosphate plant there are substantial leakages of compressed air and electric lights often are used for no good reason, while at the compressor plant often an empty electric furnace is operated and electric lights are burned in the daytime.

Time and again I have been convinced, and, incidentally, I have convinced others that the following are only minor forms of waste of electrical resources, but their importance is never small. At many enterprises home-made hot plates are widely used. They are in demand at Azneft' [Azerbaijan State Petroleum Production Association], the electric-refrigerator and bearing plants and Bakgazapparat, and the list could be continued. They are "in style" at public eating enterprises and in marketing organizations. Statistics state that the use of home-made electric-heating devices and the unsatisfactory operation of electric furnaces in the republic lead to annual losses of 2 million kw-hr of electricity. And still another calculation. We have little in the way of a procedure for operating street lighting and illuminated advertising in many of the republic's cities. And, as a result, about 1 million kw-hr of electricity were overexpended last year.

I would like to bring up still another question. Unfortunately, at some enterprises not always by far do we find that attention has been paid to our recommendations and calculations. We have estimated that strict observance of the savings regime will enable 28 million kw-hr of electricity to be saved this year in Azneft', 16 million at petrochemical plants, 9 million at machinebuilding plants, and 8 million at such an energy-intensive enterprise as the Sumgait Aluminum Plant. The main thing is to see to it that existing resources are used thriftily and to guide each worker toward a broad search for production reserves. These are the dictates of our times.

The "Main Directions" set the tasks of raising the reliability of the national economy's electric-power supply and reducing the prime cost of electricity. This should be solved at the proper level from the start of the 11th Five-Year Plan.

11409
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ENERGY CONSERVATION

LATVIAN SHIP CREW DEVISES HEAT REUSE SYSTEM

Moscow VODNYY TRANSPORT in Russian 16 Apr 81 p 2

[Article by V. Lushchevskiy (Riga): "Fuel Is Used Again"]

> [Text] The necessity for wide utilization of secondary resources of spent fuel and oil is a problem of exceptional urgency for marine transport. The creative thought of the best rationalizers and technical-progress enthusiasts of the Latvian Shipping Line have for some years been striving for the effective use of spent product from "black gold." They have been anxious to work out a harmonious system that will enable the processing and secondary use of such materials.
>
> The crew of the motorship "Konstantin Tsiolkovskiy," jointly with the collective of the Heat-Engineering Department, has developed and introduced a set of measures for the use of secondary fuel and energy resources. Their experience has been approved by a decision of the bureau of the shipping line's party committee. It has been recognized as necessary to widely propagate this valuable initiative and to introduce it on the basin's ships.

The initiative of the crew of the motorship "Konstantin Tsiolkovskiy" is a new step in the engineers' search for fuel and power resources. It is known that only part of the heat introduced into a marine engine goes to useful work. To speak more precisely, it is only 40-45 percent. The remainder is carried away in exhaust gases and cooling water. It is understandable from this what an important reserve for savings the use of this heat can become. It is no accident that the Heat Engineering Department, while developing basic measures for saving fuel and power resources during the 11th Five-Year Plan, contemplated taking the course of utilizing the heat of the cooling water of the main and auxiliary engines. The idea was approved by Sevzapflot, a state cost-accounting association.

It stands to reason that the conditions under which the unified technical service of the motorship "Konstantin Tsiolkovskiy" operates, as well as the concrete problems of making savings that it encounters, are similar to those of other ships of the shipping line. A merit of this collective is that it is one of the first to be included in the movement to save fuel and energy resources, having pointed out a concrete way to achieve the goal: use of the secondary heat of the cooling water. Since the very start, the main directions of this work were defined by the members of the crew, in close collaboration with the shipping line's Department of Heat Engineering, which gave precise engineering recommendations.

After working out and introducing the set of engineering measures, sailors of the "Konstantin Tsiolkovskiy" began to make use of the heat of the cooling water of the main and auxiliary diesel generators for purposes of raising the temperature of the turbogenerator's condensate, heating the feed water of the heat-recovery boiler, and heating the air-conditioning system. It also undertook to heat the fuel-settling and fuel-service tanks, and it is used to raise the temperature of the wash water. It stands to reason that such a rationalization affects favorably the economic indicators of the crew's work.

Specifically, what has been changed after the measures that the crew effected by its own engineering plans, in accordance with the recommendations of Heat-Engineering Department specialists?

First of all, the consumption of steam for heating the living and service areas was reduced, as well as for heating the service and settling tanks for heavy fuel and the wash water. Heat-engineering tests conducted at the end of last year confirmed this with full clarity. This means that it has become possible, during 1981, to reduce by one-fifth the fuel consumption norms for auxiliary mechanisms during those hours when the ship is under way.

All the engineering subtleties which occasioned, in the final analysis, the success of what had been conceived can be traced in the drawings and calculations that were appended to the description of the initiative. But the path to executing the rationalization was not entirely simple for the mechanical engineers, the motor mechanics, the navigators and all the members of the "Konstantin Tsiolkovskiy" crew. The sailors implemented with their own hands the lion's share of the recommendations that representatives of the Heat-Engineering Department and the supervisors of other engineering services had made. In particular, they installed the equipment themselves--the pumps, preheaters and pipelines.

In the final analysis, the system of utilizing the heat can be said, with full justification, to be the fruit of the collective's creativity. The tanker's crew manifested a truly proprietary concern for reserves of savings. Specialists have been convinced that the initiative that we are talking about has paramount significance for "Velikiy Oktyabr'" and "Komandarm Fed'ko" type tankers, the number of which continues to increase in the shipping line. On these ships, the steam productivity of the heat-recovery boilers is inadequate for providing a full load for the turbogenerator during the under-way regime. Steam savings for preheating wash water, air conditioners and the service and settling tanks will enable the turbogenerator to be loaded more fully. The variant under which one must manage without the diesel generator sometimes is not excluded, and this will enable not only fuel to be saved but also the service life of the unit to be extended.

On the whole, wide dissemination throughout the shipping line of the experience of the sailors of the tanker "Konstantin Tsiolkovskiy" promises to make a meaningful contribution to the savings money box. If it is put to use on all ships, it will be possible to save a substantial amount of fuel.

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EXPERIMENTS IN ENHANCED EXTRACTION OF PETROLEUM

Minsk SOVETSKAYA BELORUSSIYA in Russian 1 Apr 81 p 2

/Article by BELTA correspondent V. Khodosovskiy (Minsk): "The 'Second Wind' of Wells"/

> /Text/ Scientists of the Belorussian Academy of Sciences have completed a series of studies, the goal of which is the increase of the recoverability of petroleum from productive rock. It has been decided to use the innovation extensively at the deposits of the Pripyat basin.

The needles of the manometers vibrated and unhurriedly began the recording of the readings. 100, 200, 500 atmospheres. Behind the sturdy walls of the pressure chamber everything was as if under a 5-kilometer layer of ground. Enormous pressure, high temperature and an aqueous solution attacked at the same time the samples of cores saturated with Poles'ye petroleum.

The experiment continued for several hours, but the column of dark brown liquid in the volumetric flask did not rise. The conditions had arisen, when the water being fed into the "productive layer" not only ceased to force the petroleum from the microfissures, but also enveloped it with an impenetrable film.

"It is the same trouble that also occurs in real extraction," P. B. Tsalko, senior research associate of the laboratory of heat and mass transfer in the earth's interior of the Institute of Geochemistry and Geophysics of the BSSR Academy of Sciences, comments on the experiment. "The injection of water today is the most prevalent means of increasing the petroleum yield of beds. But it helps up to a certain stage, until the water due to better fluidity clears its paths in the rock and pours into the output well instead of petroleum. The operators say in such cases: the flooding of the deposit has occurred. But about 60 percent of the petroleum still remains in the ground!"

While the conversation proceeded, the pumps of the unit of the hydrodynamic studies came back to life. But this time it was not water, but a solution reminiscent of diluted detergent that was fed into the core sample. After a few more minutes the first oily drops rolled into the flask. The "depleted" core sample was again yielding petroleum!

"This time a solution with so-called surfactants was injected," the person speaking with me explains. "They penetrate the pores of the productive bed and release the petroleum particles from the 'captivity' of the aqueous film, while at the same time washing them from the rock. In this way the petroleum yield of the bed is increased by 8-10 percent. Without additional drilling operations, without the construction of underground mains it is possible at practically unproductive deposits to obtain an appreciable flow of 'black gold.' And if the method is used in the initial stage of their working, the power expenditures decrease significantly: it is possible to feed much less water into the bed."

The collective of researchers under the direction of USSR State Prize winner and Academician of the BSSR Academy of Sciences G. V. Bogomolov, one of the discoverers of Belorussian petroleum, needed several years of intense research to achieve these results. The conditions of the occurrence of petroleum, which are specific for each region, were modeled. The effect of numerous reagents on beds was tested. The best of them were selected, the method of their industrial use was found. Today these recommendations have already been turned over to the extractors, while the scientists have begun to ponder new mysteries of petroleum-bearing beds.

"The increase of the yield of deposits, which was discussed at the 26th party congress, also depends on reliable means of extracting viscous petroleum," P. B. Tsalko says. "Today light petroleum of specially high quality is being produced in the republic. But the reserves of low-grade petroleum, which industry also needs, remain untouchable: there is no effective means of extracting them. And then, while experimenting with surfactants, we discovered that under certain conditions they are capable of increasing the yield of viscous petroleum by four- to fivefold, by thinning it in the bed. The first results are reassuring, soon we will conduct field tests."

I left the laboratory when the indicator panel "Caution, high pressure!" again began to flash in warning above its door. A new experiment has begun. This means that Poles'ye petroleum will soon reveal to man another of its secrets.

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FUELS

PETROLEUM ORGANIZATIONS RESPOND TO CRITICISM ON PRODUCTION BY TERTIARY METHODS

Baku VYSHKA in Russian 10 Apr 81 p 2

[Article: "'A Green Light to Tertiary Methods'"]

[Text] The material of the special assignment brigade of worker correspondents of VYSHKA, which was published under this title at the end of December 1980, has been discussed at all the organizations to which the criticism of the newspaper was addressed.

General Director of the Azneft' Association B. Gadzhiyev reported that the criticism leveled at the association was recognized as just and timely. The appropriate services and shops of scientific research and production operations of the petroleum and gas production administrations were commissioned jointly with Azneft' to make an analysis of the geological and operating data for all the objects being worked and to outline measures on introducing new methods of increasing the petroleum yield of the beds. These measures should be the basis for the elaborated comprehensive program of the use of new methods, which is being drawn up by AzNIPIneft' [Azerbaijan Scientific Research and Design Institute of the Petroleum Industry]. According to preliminary data, they will make it possible during the 11th Five-Year Plan to produce more than 500,000 tons of liquid fuel.

An operations group, which is made up of production workers and staff members of a number of union and republic scientific research and design institutes, has been set up for stepping up the monitoring of the management of the process of intrabed burning at the Khorosana site. AzNIPIneft' jointly with the Karadagneft' Petroleum and Gas Production Administration have been commissioned to submit their proposals on the technology and the dates of the initiation of intrabed burning at the Umbaka site. Measures on eliminating the shortcomings in the construction of the Balakhany underground oil field have been outlined.

The materials of the special assignment brigade were recognized as basically correct by the Kaspmorneftegazprom All-Union Industrial Association. Comprehensive measures on the increase of the petroleum yield of the beds have been elaborated and submitted to the republic Gosplan in order to eliminate the existing shortcomings. The measures, in particular, provide for the increase of the amount of work on water- and oil-soluble polymeric flooding and flooding using surfactants at the Sangachaly - Duvannyy-more - Lake Bulla deposit, the extension of the process of the intrabed pocket of burning at the Lake Artema deposit, the continuation of experimental operations on the injection of hot water into the formation of the sub-Kirmakinskiy series of this deposit and so on. In the response of Kaspmorneftegazprom it is indicated that at the Lake Artema deposit the thermal influencing of some petroleum formations not only has not been halted, as is indicated in the material of the special assignment brigade, but, on the contrary, the extent of its adoption is increasing with each year. At present the flow sheet for the expansion of intrabed burning for new clusters of wells of the Artemneftegaz Petroleum and Gas Production Administration is being drawn up.

Chief of the Shirvanneft' Petroleum and Gas Production Administration V. Mamedov reported that the critical remark of the newspaper about the injection of surfactants with a concentration less than the norm for intensifving production is just. At present the concentration of sulfanol has been brought up to the norm, and the experimental operations on alkali flooding are continuing.

The criticism of the state of the adoption of new methods of increasing the petroleum yield of beds is recognized as basically correct by the management of the Karadagneft' Petroleum and Gas Production Administration. In the response signed by administration chief A. Geydarov it is noted in particular that the Soyuztermneft' All-Union Scientific Production Association is completing the compilation of a plan on the introduction of intrabed burning at the Umbaka site on a scientific basis.

The response received from AzNIPIneft' cannot be satisfying. It is noted in it that at the meeting of the management of the institute the criticism of the newspaper was recognized as correct, but then in the response signed by deputy director E. Aliyev all the critical remarks of the worker correspondents of VYSHKA, which were aimed at AzNIPIneft', in reality are completely rejected. Such an attitude toward critical remarks can hardly promote the improvement of the matter.

The article of the special assignment brigade was not given proper attention at the Leninneft' Petroleum and Gas Production Administration. In the response signed by N. Manyukhin, chief engineer of the administration, it is stated: "As to the remark of the newspaper about the ruin of individual units of the OVG-3 equipment, to a certain degree this conforms to reality." Do you see "to a certain degree," although in the response of Azneft' it is stated that "there has been pointed out to the management of the Leninneft' Petroleum and Gas Production Administration the need to adopt strict measures on the assurance of the state of preservation of the received OVG-3 stations." The critical remarks concerning the efficiency of the process of intrabed burning turned out to be not totally accurate. At the same time a fact remains a fact. The petroleum and gas production administration did not fulfill the assignment on petroleum production for 1980 by means of the introduction of intrabed burning.

In the responses of the Azneft' Association and other organizations it is emphasized that the extensive introduction of modern methods of increasing the petroleum yield of beds is being checked due to the lack of an adequate amount of the necessary chemical reagents and special equipment.

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FUELS

METHOD SUGGESTED FOR OILFIELD DEVELOPMENT PLANNING

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 6, Jun 81 pp 84-86

[Article by USSR Academy of Sciences Academician A. Krylov: "Some Problems in Development of Oil Extraction"]

[Text] The "Basic Directions for the USSR's Economic and Social Development in 1981-1985 and in the Period to 1990" foresee extracting 620-645 million tons of oil (together with gas condensate) in 1985. Choice of the systems for developing the oilfields is to play a large role in reaching this important national economic target.

Oil is being extracted in our country in many regions characterized by different natural bedding conditions and by different stages of oilfield exploitation. Given such a situation, it is very important to find those characteristics of extraction development which would in fact play the main role. This is important to determining the prospects for further development of oil extraction.

It is difficult to reveal the parameters controlling oil extraction because of the constantly changing extraction conditions. The situation is different for a stable oil extraction process. Elementary constructs obtained for such a stable state can reveal a number of basic premises. In addition to qualitatively evaluating the influence of a given parameter on development of oil extraction, they may also be used to evaluate the quantitative aspect of the process, if owing to relatively small change in conditions over time, the process would approach a stable state. Let us examine oil extraction on a large scale, where it is arbitrarily said to have no limitations, and where it proceeds with geological-physical conditions, drilling rates, and exploitation technology which remain constant over time. Let us assume that N wells are placed into operation each year. As drilling proceeds in the oilfields, the number of wells increases and their total output rises, but this process would be an attenuating one, since owing to depletion of individual wells, each year the total decrease in extraction from old wells would rise. With time, this decrease would attain an amount equal to the initial yield of the new wells, after which the process would stabilize. The annual total extraction volume for all wells would be constant, and in a steady-state situation it would be equal to the oil reserves placed into exploitation by new wells each year.

Thus the maximum annual yield* stabilizes at the level

$$Q = q_{res}N, \qquad (1)$$

where q_{res} is the volume of the initially extracted reserves, per well.

I made the assumption that the geological and physical conditions of the exploited oilfields were constant and fully determined.

Let us examine how the extraction process changes if the productivity of the beds is made different while everything else, including the size of the reserves per well, remains the same. Let us assume that productivity has risen. The volume of reserves placed into exploitation each year would not change, since the size of the reserves per well and the quantity of new wells placed into operation each year would remain as before. Consequently the stabilized annual yield will also remain as before. But because the yield per well would increase owing to the greater productivity of the beds, the stabilized annual yield would be achieved with a smaller number of wells in a correspondingly shorter period of time. Were the beds to be exploited less productively, we would see the reverse pattern--that is, that same stabilized annual yield would be achieved by a larger number of wells over a correspondingly longer period of time.

Were we to change just the size of the reserves per well, if the size of these per-well reserves were to be large and the number of new wells introduced were to be constant, the stabilized annual yield would be greater, but the number of wells in operation would increase correspondingly. Were the size of the reserves per well to be lower, the annual yield and the number of wells in operation would decrease.

Thus change in any of the oilfield exploitation conditions will correspondingly change the course of extraction development.

The transition to a new exploitation process would occur gradually, as wells operating in the former conditions are shut down and the number of wells operating in the new conditions rises.

In a real situation, the oilfield exploitation conditions constantly change, and therefore the extraction process, which reflects all changes in the oilfield exploitation conditions, would change constantly as well. However, it would tend toward a stable state, which would be possible only in the event that the conditions under which the oilfields are exploited do not change for a long period of time.

And so, in a stabilized process the annual oil yield would depend only on the size of the initially extracted reserves, per well, and on the quantity of production wells placed into operation each year at new sites. If for one reason or another the quantity of these wells is limited, the initial per-well reserves would essentially predetermine the yield.

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*See NEFTYANOY KHOZYAYSTVO, No 4, 1974, pp 28-30.

Thus the size of the initial per-well reserves would have exceptionally important significance to the sector's development. This can be confirmed by the following example. Assume that 10,000 wells will be placed into operation each year in the future. In this case each of these wells would tap a reserve of 100,000 tons, meaning that the annual yield would tend toward 1 billion tons. But if, as is sometimes predicted, the average initial reserves per well are limited to 7,000 tons, assuming that the same 10,000 wells are placed into operation each year, the annual yield would tend toward 70 million tons--that is, 14 times less!

The development of oil extraction is typified not only by the parameters noted above, but also by other characteristics. Very interesting among them is the so-called diminution factor, K_d--the ratio of the decline in the annual yield from wells undergoing transition to the total yield.

Using our previously defined symbols, we can write the following for a stabilized oil extraction process:

$$QK_d = q_i N, \qquad (1)$$

where q_i is the initial annual well yield.

Hence, considering formula (1), we get

$$K_d = \frac{q_i N}{Q} = \frac{q_i}{q_{res}} . \qquad (2)$$

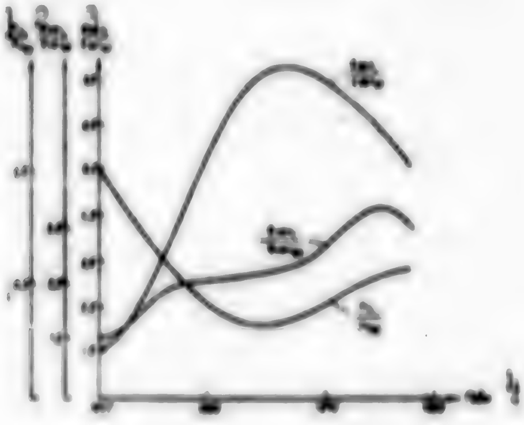
The diminution factor, which represents important characteristics of the extraction development process such as the rate at which the reserves are depleted and the stability of well productivity, is unfortunately not examined anywhere, and it is not subjected to analysis. As a result we lose a faithful and sensitive indicator reflecting development of oil extraction.

We can see from formula (2) that the size of the diminution factor depends on the size of the initial oil reserves, per well, and on the initial yield of the wells. The higher the per-well reserves, the lower is the diminution coefficient and the more stable is the well yield. Furthermore, when the reservoir properties of the bed are better the diminution factor is higher (under otherwise equal conditions), and when they are poorer the diminution factor is lower, contrary to popular belief.

Thus far we have been discussing stabilized conditions for extraction development exclusively. But in real conditions the parameters examined above, governing development of oil extraction, undergo continual change. This means that dependencies (1) and (2) would actually consist of a larger number of partial values for each year. Thus the values of Q and K_d would be typical not of the values of q_{res}, N, and q_i for the previous year, but rather of the weighted values for a number of years.

Dependence (1) characterizes the quantitative side of the extraction development process, while dependence (2) represents the qualitative side; let us consider change in the parameters of the latter using real data.

The figure below represents actual change in the averages of $\frac{q_{i_t}}{q_{i_{50}}}$ and $\frac{K_{d_t}}{K_{d_{50}}}$ for the petroleum sector beginning with 1950.



Key:

1. $K_{d_t}/K_{d_{50}}$
2. $K_{i_t}/K_{i_{50}}$
3. $K_{res_t}/K_{res_{50}}$
4. Years

The first curve shows that the yields increase constantly, except in the last 3 years. The first increase--in the early 1950's--was elicited by growing application of flooding, and the second--in the first half of the 1970's--was elicited by the start of development of highly productive oilfields in West Siberia. The initial average well yield began to drop in 1976, because in addition to introduction of high-yield wells into operation in West Siberia, the proportion of these wells with an average yield grew. But the yields were the highest in the Ninth and 10th five-year plans.

The second curve, $K_{d_t}/K_{d_{50}}$, was also plotted on the basis of real data. It exhibits typical change over time, and it dropped intensively beginning in the 1950's. The decline was caused by an increase in q_{res}, because during this period wells were drilled very sparsely. As the proportion of these wells increased, K_d dropped until 1963-1965, after which it stabilized for some time, and since 1968-1970 it has been steadily increasing. This trend might have been elicited by growth in q_i, or a decrease in q_{res}, or by both together.

Such a process also occurred in the last 2 years, when the initial yields started to decline; therefore the increase in K_d was elicited in the first period by both an increase in q_i and a decrease in q_{res}, while in the most recent period it was elicited only by a decrease in q_{res}.

We cannot plot a curve for q_{res} because real data are absent. Therefore, let us plot the curve $q_{res_t}/q_{res_{50}}$ by computation, using formula (2). First it rises steeply (see figure), reflecting a transition, which occurred at that time, to drilling sparse networks of wells on the formations. The growth of the computed values follows about the same trend that would be observed in practice. However, after 1969-1970 this curve dropped dramatically and intensively, indicating a progressive decline in the reserves per well, and this process is continuing into recent times.

Thus development of oil extraction basically depends on three parameters: q_i, N, and q_{res}.

The higher the value of parameter q_i, the greater the economic effectiveness of the process would be, the latter depending basically on natural conditions, and only in part on technology. An increase in the average value of q_i can sometimes be achieved by exploiting the most productive oilfields predominantly, and implementing the appropriate technological measures.

The number of wells placed into operation each year, N, depends either on the demand for oil or on the possibility afforded by material, technical, and labor resources.

Parameter q_{res} is extremely important. Its size depends entirely on the technology adopted, and therefore it cannot have a broad controlling influence on the development of oil extraction. As we can see from formulas (1) and (2), the higher we set the value of this parameter, the greater is the effectiveness of extraction development.

However, change in q_{res} also has a great influence on a number of other characteristics of extraction development, and therefore it can be enlarged only within certain limits. Thus as q_{res} grows, the final oil output coefficient decreases. There is an upper limit to growth of q_{res} that depends on the conditions of oilfield development.* But in most cases the optimum value of q_{res} would be determined on the basis of optimum development of the extraction process, with a consideration for the entire diversity of developmental conditions and the available possibilities, as well as for the changes they will experience over time; the criterion of such optimum development will be: Development of oilfields must ensure attainment of the oil extraction volume set for the sector, at the least outlays on exploration, extraction, and transportation of the oil, coupled with the fullest possible (economically feasible) extraction of the oil from the subsoil. We do not at the moment have a unified approach to solving this great and complex problem; nevertheless the work in this direction should be not only continued, but also intensified.

The method adopted by the USSR Gosplan for oil extraction planning relies predominantly on the principal characteristics defining development of oil extraction--q_i, N, and K_d, which confirms the validity of this method. However, from my point of view a certain correction needs to be made--the integrated characteristic K_d should be substituted by the direct characteristic q_{res}, or the latter should be introduced as a supplement to K_d.

Moreover it would be suitable in my opinion to separately consider wells drilled in new unexploited or partially exploited areas--that is, we should distinguish the increment of new reserves in category "A".

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* See NEFTYANOYE KHOZYAYSTVO, No 6, 1980, pp 28-30.

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FUELS

STATUS OF KARAGANDA COAL MINING REVIEWED

Moscow IZVESTIYA in Russian 12 May 81 p 2

[Article by A. Korkin, first secretary of the Karagandinskaya Oblast Committee of the Kazakhstan Communist Party: "The Coal Seams' Reserves"]

[Text] The oblast's workers have moved out confidently during the 11th Five-Year Plan. The successful start results from the achievements of last year, which laid a firm base for the further economic and social development of our industrial district. About 2,000 collectives and 60,000 advanced production workers carried out 10th Five-Year Plan tasks ahead of schedule. Industrial production during this period rose by 16.5 percent. One billion rubles' worth of fixed industrial-production capital was updated. And, finally, the share of Karaganda Basin coal miners in the successes achieved was meaningful.

The basin has at its disposal today a high-capacity industrial base, which includes, aside from the underground mines, a complex of enterprises, plants and scientific institutions that support stable work for the miners. This enables Karagandaugol' [Karaganda Coal Production Association] to occupy one of the leading places in the industry for average daily workload per mine, breakage face and longwall mining complex and to achieve the highest results also for such an important indicator as labor productivity. The bases for the achievements are major work to reequip enterprises with machinery, a high degree of longwall mechanization, and the construction of new and the rebuilding of existing underground mines. The activity of party, soviet and social organizations, which did much to raise the operating effectiveness of the miners' collectives and to introduce advanced experience widely, was subordinated to this. During the 10th Five-Year Plan the Tentekskaya Underground Mine, with an annual productivity of 4 million tons of coal, was put into operation, the Vostochnaya Preparation Plant was built, and the rebuilding of three mines was completed. This will enable production capacity to increase to 52 million tons of coal per year.

The requirement to use completely and expeditiously everything at the country's disposal was advanced at the 26th CPSU Congress. In analyzing the association's work from this standpoint, it is clearly evident that more could have been done and the results could have been more meaningful and substantial. There are many reserves that still have not been brought into action.

We still have no few problems that remain to be resolved during the 11th Five-Year Plan. And much has already been done toward this end. The "thousandeer" and "500,000-tonner" movements, which are based on sending 1,000 tons to the surface per shift and 500,000 tons of fuel from a longwall per year, are being expanded in the basin. A fourth of all underground mining is now being performed by these entities. The initiative of the miners of the Underground Mine imeni Kostenko, where each section is mining 500,000 tons or more of coal per year, has been disseminated everywhere. The work experience of Heroes of Socialist Labor Ya. Musagaliyev and A. Kubaychuk, 26th party congress delegates S. Tokumtayev and USSR State Prize winner A. Zhanaydarov, and other advanced workers in the schools of advanced experience that have been created is constantly being generalized.

The collective of the Underground Mine imeni 60-Letiya Oktyabr'skaya Revolyutsiya, which was awarded the challenge Red Banner and Commemorative Emblem of the CPSU Central Committee, the USSR Council of Ministers, the AUCCTU and the Komsomol Central Committee for 10th Five-Year Plan results is an example of the skillful use of reserves. Many difficulties had to be surmounted here to support the high work pace. The main one of these was the complicated mining-geology environment, which did not permit the use of longwall mining machines at full capacity. With the help of innovators, certain components of the unit were improved, and the repair service was strengthened.

There are no few examples of a thoughtful and truly solicitous attitude toward the job. And it is gratifying that their number increases each day. However, as has already been said, the coal workers have been operating below their potential. And one of the important causes of this situation is the unintegrated solution of problems of the basin's economic and social development.

Each year the mine-geology conditions that the miners face become increasingly complex. The phenomenon is natural: the coal has to be mined at depths greater than was the case, let's say, several years ago. The conclusion inevitably presents itself--the more complicated the conditions, the more capital investment that is required to maintain the longwall. However, instead of this, during the 10th Five-Year Plan the allocations not only were not increased but were reduced by 13 kopecks per ton of coal mined. This entailed a reduction in the penetration of new horizons. Moreover, the designs specified that coal-mining enterprise capacity be increased not by cutting additional longwalls but by increasing the workload per breakage face. As a result, the disproportion prevailing in the basin between the pace of coal mining and the growth of capacity affects, in the final analysis, fulfillment of 10th Five-Year Plan tasks.

Working the lower horizons, experience indicates, also requires a qualitatively different approach, improved technology and, finally, changes in traditional work methods. And the scientists, who still have not proposed any effective methods for doing mine excavation work at great depths and have not created the necessary set of means for mechanizing shortwalls, are in great arrears here to the miners. And the equipment that industry produces is delivered to the miners in limited quantities.

Let us take, for example, monorails, which have proved themselves well for our environment. They arrive in the basin in such an amount that even today materials and equipment are brought to the mine face manually. This affects adversely not only the pace of preparation of new mine faces (during the five-year plan the lag was about 140 km), but, above all, the miners' working conditions. Often they have to work on rest days in order to meet their goals. Finally, this affects also the periods of equipment operation--time for preventive repair is reduced, and this in turn increases the danger of accidents. The mine-geology conditions under which coal has to be mined today has engendered still another problem--a search for effective means for supporting the mine workings, at which, as excavation depth increases, so does rock pressure. Metal supports, as is well known to the miners not just of the Karaganda Basin, are a more reliable and durable type of support. But because of the shortage of such supports, half of the workings adjacent to mine faces are supported, as a rule, by wooden posts, and these are add-ons.

Today mine horizons not only go deeply, following the coal seam, but they lie directly under the city, where thicker fuel reserves are located. Today 10 million tons of coal are being mined here. By the end of the 11th Five-Year Plan the pace of mining will grow substantially. This in turn will pose a number of problems in protecting housing and social buildings in the sections of the city that are being undermined. Because of the lack of an adequately effective technology for gobbing hollowed-out space, about 30 percent of the buildings in this zone need to be overhauled or moved to another location. Existing methods for hydraulic and pneumatic gobbing are very expensive and have not been perfected, and, above all, there is the fact that sand, of which there is not much in the oblast's ground, is used as the material. Moreover, the pipe along which ballast is fed to the mine face quickly goes out of operation. It is necessary to find ways to gob excavated space with local materials and to increase the wear resistance of the pipes. As for the first, so far only scientific discussions have been held on that score. There is little reinforced pipe, the output of which the plants are only now mastering. Finally, the miners need special machines that will enable this labor-intensive work to be mechanized.

Measures are being taken in the oblast not to allow a reduction of the housing inventory. On the average, the miners are erecting by their own efforts alone 13,000 square meters of housing annually. However, the shortages of housing continue to be a restraining factor in growth of coal output. The mines can work coal reserves under housing buildups, provided the people are resettled from the zone being undercut. But not enough funds are being allocated for building the housing. And this despite the fact that there is special authorization to build housing, cultural and personal-amenity facilities through industry grants. It is planned in 1981 to introduce 30,000 square meters of housing less than what was called for, and 8,000 square meters less than what has been introduced annually in the basin. If the housing problem is to be solved at such a pace, then the mining of 38 million tons of coal under built-up land planned under the 11th Five-Year Plan will be in doubt.

A tense situation prevails also in the basin with respect to making up for abandoned capacity during the new five-year period. One the whole, this amounts to 4.2 million tons. Expenditures for compensating for it are 1.21 rubles per ton of mining, while USSR Ministry of Coal Industry has specified only 0.94 ruble. Karagandaugol' has introduced substantiated proposals about the construction during the new five-year plan of one new mine and the rebuilding of four existing mines. However, the plan calls for the reconstruction of just one, and this clearly is inadequate. Construction of the new Borly Strip Mine, with an annual productivity of 8 million tons per year, and of a new preparation plant, whose introduction would enable coking coal to be upgraded locally and freight haulage to be reduced in amount, should be speeded up.

Of course, the problems can be reduced much in severity by equipping mining faces with mechanized complexes. But the plan for 1981 allocates scarcely enough of them to replace those that are worn out. Moreover, almost a third of the complexes being used do not correspond to existing mine-geology conditions. The KM-130, OKP-70 and MK-75 complexes approach it closest of all. Because of this, it would be desirable to call for development of the productive capacity of Karagandagormash [Karaganda Mining Machinebuilding Association] so that Karaganda's coal machinebuilding plants would be the main suppliers of the mechanized complexes named.

The oblast's party and economic organs are taking measures to use internal reserves and opportunities for increasing coal mining. In particular, by raising the quality of repair of underground mining equipment and by introducing company servicing of longwall mining machines by Karagandagormash, it is planned to greatly reduce accidents at longwalls. The Karagandugol' management faces the task of reducing to the minimum the number of mines that are not mastering design capacity, of providing for the introduction of ventilation shaft complexes at mines that experience difficulties in providing air to the workings. The main attention of supervisors of coal enterprises and collectives of scientific-research and design-development institutes is being directed toward improving mine-tunneling work and the introduction of the newest equipment and technology into entry faces.

We consider that labor activeness and initiative of the masses, the development of socialist competition, and the propagation of advanced experience are among the main factors for stable work in the basin. Collectives of "500,000-tonner" sections and of high-speed tunneling brigades, which, in showing themselves as models of a communist attitude toward work, provide for maximum labor productivity, are given special concern in the oblast. Taking into account the workforce shortage, they are following the line of increasing the number of such highly productive sections in brigades in every way possible.

Right now the miners, like all the oblast's workers, are laboring persistently to implement 26th CPSU Congress decisions. Each day is marked by ever newer achievements that lay a firm foundation for carrying out 11th Five-Year Plan tasks.

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FUELS

FACTORS DELAYING PROGRESS AT EKIBASTUZ COAL FIELD POINTED OUT

Moscow IZVESTIYA in Russian 28 Apr 81 p 2

[Article by V. Kulagin (Ekibastuz, Pavlodarskaya Oblast): "A Redoubling at Ekibastuz"]

> [Text] "Build up coal mining at the Pavlodar-Ekibastuz Regional Production Complex...."--From the "Main Directions for the Economic and Social Development of the USSR During 1981-1985 and During the Period up to 1990"]

Every city has its own symbols and the scoop of a 3-cubic yard excavator that is installed on a small pedestal beside the railroad station has become Ekibastuz's. In December 1954 operator N. Kolotev loaded up the first trainload of coal with this scoop. And in the middle of 1980 the brigade of the 3,000-eer rotary excavator supervised by S. Zubko mined its 600-millionth ton of the country's cheapest fuel at Bogatyr', the country's largest strip mine. Not one strip mine in the country has yet reached this pace of growth by the open-cut method.

During the 10th Five-Year Plan alone about 279 million tons of coal were mined--almost 96 million tons more than during the preceding five-year plan. The miners' labor productivity increased by more than 35 percent. And the socialist commitment for the collective of the Order of Labor Red Banner Ekibastuzugol' [Ekibastuz Coal Production Association] has set a goal of 72 million tons for the first year of the 11th Five-Year Plan. In essence, coal mining would, on the average, double every 5 years.

Simultaneously, operating schemes for mastering strip mines under difficult mine-geology conditions have changed radically. The local coal seam is marked by special hardness. The industry's scientists, along with the machinebuilders, had to do a lot of work to create a set of rotary equipment that would enable output per coal miner to be increased severalfold.

Various principles of the theory of cutting mine rock were reexamined, a basically new standard practice for drilling and blasting operations was created, and the whole transport activity of strip mines was restructured. Nowadays almost a score of modern rotary mining complexes with a productivity of 1,000 to 5,000 tons of fuel per hour are operating here. The potential of such machinery is truly grand: for example, at the Bogatyr' Strip Mine alone more than 130,000 tons of coal are turned out daily. The cost of the Bogatyr' fuel has been reduced by the newest technology--the prime cost per ton thereof is little more than 1 ruble.

The technical reequipping of strip mines continues in accordance with decisions of the 26th CPSU Congress, which attribute great importance to mining coal more effectively by the open-cut method, based on the wide introduction of progressive technology and mine-transport equipment of high unit capacity. Tests of RP-2500 rotary excavators with a productivity of 7 million tons of coal per year, which are made by the Zhdanov Heavy Machinebuilding Plant and are specially designed for excavating tough seams, are under way. Also being introduced are dump cars with their drives (motors), which can deliver rock over the steep sides of the strip mines.

"Of course, an increase in the pace of coal mining was and remains our main job," Bogatyr' Strip Mine director V. Kalandarishvili considers. "During the last five-year plan the sphere of our operations expanded remarkably. The miners are now thinking of sending high-quality coal to Urals, Siberian and Kazakhstan power stations and to do so at a constant pace. Therefore, we have received wide support for the agreement on collaboration among the miners, transport workers and power-engineering workers of these regions. Integrated brigades and associations and excavator operators, drillers and track workers, who are being paid for the final results, that is, for the amount and quality of coal mined, are exercising an important influence on more precise work of the coal-industry conveyor."

New forms for organizing operations have enabled the labor productivity per mine worker of the association to be raised from 764 to 1,041 tons of coal per month, which exceeds the industry average more than 2-fold. And at the Bogatyr' Strip Mine this indicator has reached 1,390 tons.

Ekibastuz is to be given a special role in the 1980's in developing the country's power engineering. Five GRES's of 4 million kilowatts of power each are being developed, based upon the coal field. Among the main directions for developing the country during the coming decade is the construction of such thermal stations, which are to be introduced at a rapid pace. Already three 500-megawatt units of GRES-1 are supplying current, and this year it is planned to start up three more such units. Each month the work front at GRES-2 is being expanded. The first tens of kilometers of an LEP-1500 [1,500-kv power transmission line] have been laid in the direction of Tambov.

It has been estimated that the annual savings alone from the Ekibastuz group of GRES's and from transmitting the electricity to areas of the Central Economic Region in the European part of the USSR, the Urals and Kazakhstan will exceed 100 million rubles. For the prime cost of the electricity of the power stations that will be based upon Ekibastuz coal will be one-third to one-fifth that of those based upon Donets, Kuznetsk or Moscow basin coal, according to KazNIIenergetika [Kazakh SSR Scientific-Research Institute for Power Engineering] data.

"In the near term," says Ekibastuzugol' General Director Hero of Socialist Labor and USSR State Prize winner S. Kurzhey, "our share in Kazakhstan's coal mining will reach 70 percent. The fuel and energy relationships of the Pavlodar-Ekibastuz Regional Production Complex are being changed greatly. Right now only a fifth of our coal is being burned locally, up to 60 percent of it being sent outside the republic, the remainder of the fuel being consumed in Kazakhstan. Soon the share of Ekibastuz coal consumption within our complex will rise to 40 percent, which will increase considerably the national-economic yield of fuel and reduce the haulage thereof."

With the introduction into operation of this grouping of high-capacity thermal power stations, coal mining in Ekibastuz should more than double, to reach 150-170 million tons per year. The basin is being developed through the reconstruction of existing strip mines and the construction of new ones, with the gradual conversion to excavation without distinction as to the grade of coal. During the 11th Five-Year Plan the main growth in mining of the fuel should come from the new Vostochnyy Strip Mine, which adjoins the Bogatyr' mine and is designed for 30 million tons of coal per year. The construction of Vostochnyy is a new stage in assimilating the basin's wealth. The conveyor method of transporting coal will be used here instead of rail transport, for the first time at a strip mine.

However, the most typical mistakes in planning and design, the placement of orders, and the distribution of capital funds are already being repeated during the initial stage of construction of this most important facility of the fuel and power-engineering complex. For example, the strip mine is already under construction, yet the preliminary design has not yet received final approval. Until now, USSR Minugleprom [Ministry of Coal Industry] has not decided what mine-transport equipment the mine will be equipped with.

Or let us take this major question. With the conversion of strip mines to operations in which coal of increased ash content is mined, without distinction as to grade, effective blending and loading complexes will be required, the first of which should go into operation at Vostochnyy in 1984. However, USSR Mintyazhmash [Ministry of Heavy and Transport Machine Building] still has not undertaken to create the flowline technology and blending complexes. But perhaps what causes the greatest anxiety is the fact that the prime contractor--Ekibastuzshakhtostroy [Trust for Mine Construction in Ekibastuz] does not have at its disposal today either a supply and equipment base or the labor resources to effect the growth planned for mining coal in the basin and for creating the social and domestic-amenity infrastructure necessary for the miners. Ekibastuzugol' does not conceal the fact that the combine is capable right now of independently carrying out only half of the construction and installing work specified for the five-year plan.

The wisest way out of the existing situation is to acquire the services of construction and installing organizations from other Union and republic ministries for construction of the coal portion of ETEK [Ekibastuz Fuel and Power Complex]. Such a concentration of labor and material resources has started at the complex, but it is still proceeding slowly and without due coordination.

Undoubtedly, attention to Ekibastuz on the part of planners, economic managers, scientists and party and soviet organs has increased in recent years. But, unfortunately, some ministries and agencies never granted further recognition to Ekibastuz's special status in developing the country's power engineering. For example, USSR Minelektrotekhprom [Ministry of Electrical Equipment Industry] at the end of the last five-year plan had satisfied many of the miners' orders by only a tenth. Rail transport is holding back appreciably the planned assimilation of new capacity for stripping and for mining coal.

Representatives of various agencies do not conceal their delight at the scale and scope of operations at the complex, but then they often forget to take a look at the workers' living facilities, dining halls, dormitories and clubs. There they would find many irregularities; the USSR Committee of People's Control recently pointed out one of them--poor ORS [workers' supply department] work.

It is no accident that this opinion can often be heard in Ekibastuz: in order to start a real doubling of coal mining, a real doubling of the construction of housing, schools, kindergartens and nurseries and facilities for personal-amenity purposes is required first.

During the 11th Five-Year Plan it is planned to build as much as 100,000-130,000 square meters of housing per year and to build 7 schools, several children's preschool institutions, 2 wide-screen cinemas, a Palace of Culture, a shopping center, an amenities-service center, and an athletic complex. It is necessary to accelerate the creation of the complex's whole social and personal-amenities infrastructure, which is telling on the flow here of fresh manpower, the stabilization of workers' collectives, and the retention in the city of power-engineering workers, miners and builders. For this is the most reliable way to raise the yield of Kazakhstan's hugest coal storehouse.

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FUELS

UPPER KAMA OIL MEN, POTASH MINERS FEUD OVER RIGHT TO EXPLOIT SAME GROUND

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 13 May 81 p 2

[Article by V. Ukolov (Perm'): "After the Dispute Is Another Dispute"]

> [Text] What prevents integrated assimilation of the Kama's mineral resources.

There is no example in world practice of oil being recovered from underneath strata of potash salts. The first experiment is being conducted in the Kama River region, in the north of Permskaya Oblast. These reserves of fertility salts are unique. They support not only the requirements of the country's agriculture--a substantial portion of the mineral fertilizer goes to export. Deposits of Kama oil also are of no little practical interest. Suffice it to say that each well near Berezniki gives as much liquid fuel as 10 in other parts of Permskaya Oblast.

The siting of two agencies on one piece of ground has caused friction between them. Since the chemists first staked their claim to the Upper Kama basin, it is they who play the part of the defenders. Oilfield workers are the attackers.

The fact that the country needs oil is a weighty argument. But the arguments of Uralkaliy [Urals Potash Production Association] are no less important. The foodstuffs program is based in large part on increasing the fertility of the fields, and the traditional method of constructing wells imposes serious harm on the potash basin. Gosgortekhnadzor [State Committee of the Council of Ministers for Supervision of Industrial Safety and Mining Inspection] stands guard over state interests, and its policy is clear: If Permenft' [Permskaya Oblast Oil Production Association] will find new drilling solutions and casing materials that are safe for the salts, then the road to the Upper Kama will be opened to it.

The oilfield workers have been assigned an area for experiment--the Durinskiy depression, where below-standard potash chloride occurs. The department of Drilling and Operation of Oil and Gas Wells [illegible] the Perm' Polytechnical Institute has undertaken to develop for the drillers [illegible] needed operating technology and drilling muds. In a short time the small collective solved this difficult problem.

It is at this stage also that the old passions have burst into flame anew. The newcomers appear to have forgotten about their strategic purpose: in collaboration with the pioneers, to assimilate the basin's riches in unison. They have been carried away by the solution of the task of the moment--it is best to take what you can. But nothing good can come from haste.

The mining inspectorate has already issued 15 injunctions against the oilfield workers. They have recorded more than a hundred violations of the terms for industrial-test operation. Here there is nonobservance of the approved drilling technology, low quality of plugging of intermediate casing and of the production string, failure to make a preliminary pressure test of the string deviation from the designed casing program, a lack of current documentation, and so on.

Meanwhile, Permneft' General Director R. Khabibullin looks at the future optimistically:

"Nothing will be harmful to the salts! The potash workers themselves have drilled hundreds of geological holes without any sort of preconditions or catches."

Uralkaliy General Director I. Borchenko counters:

"They drilled in restricted zones, and it was explained that below the potash lies an insulating stratum of rock salt, but below that is water, possibly hot water. If you break the seal and the water breaks through upward under pressure, into the productive deposits, the mines will be flooded."

Above all, there remains for the oilfield workers a third aspect: the mining inspectorate, they say, is overly critical, while the scope of the polytechnical personnel's technology is extraordinarily narrow and it is far from being perfected. The drilling mud recommended by them does not allow the bit to gather momentum, the various measurements disturb the work pace, preparation of the plugging mix takes a lot of time....Ugh, if we could but be allowed to put all this delicacy to one side and press forward!

The oilfield workers had tried to get rid of the scientists, they canceled the agreement with the institute. However, that did not come to pass. The USSR State Committee on Science and Technology and Minkhimprom [Ministry of Chemical Industry] confirmed the Perm' Polytechnical Institute as the head organization for developing the technology for drilling and casing wells in the environment of the salt section of the Upper Kama potash deposit. They were given the responsibility for designers' surveillance on this topic.

Then the Deputy Minister of Petroleum Industry E. Khalimov instructed a subordinate institute, VNIIKRneft' [All-Union Scientific-Research Institute for Oil-Well Casing Operations] to find out whether the materials for cementing the wells that had been proposed by the scientists was good. The response was ready quickly and it contained the summary: the mud is not suitable at all and is not recommended for use.

As soon as Permneft' received this destructive response, the mine inspectorate raised a prohibiting hand against every activity of the drillers in the Upper Kama: "The technology is not suitable? Then stop the machine! We will not permit harm to be inflicted on the resources."

What a long, drawn-out proceeding this raised! Even more: in the dust of the controversy, the oilfield workers had hit a knot, which held them up. Telegrams, and then even couriers, flew about, from north to south and return. Finally, in the last days of March a document was made up that testified to an obvious fact: it was impossible to verify the NIIKRneft' experiments. In brief, give it "full reverse."

Was it worthwhile to start a fight? But how interesting and creative work can be in the unusual conditions of the Upper Kama! In essence, to lay a new road in the field's business. But the Perm' oilfield workers have no time for creativity. The recovery level in the association falls so they seize a new area, in order to put their affairs right, to compensate for a shortfall in neighboring regions.

The oilfield workers, unfortunately, do not show themselves to be assiduous managers in the north of Perm'. They do not pay attention to the maintenance of reservoir pressure. At the Yurchuk field, for example, about 9 percent of the water from the recovered crude was injected, although the design for this stage of development called for 80 percent. Operations are being conducted by the expeditionary method, enlisting the forces of several of their enterprises. Would it not be more correct to establish a specialized subunit here?

The fact that 1.5 million tons of crude had been taken at the allocated area during a short period is passed off by the association's managers as a major achievement. But reserves of the liquid fuel permit much more to be recovered here.

To go to USSR Gosplan for authorization for industrial development with only a conclusion about the presence of petroleum being confirmed is extremely superficial. An integrated program of measures that protects the interests of the potash partners must be presented. However, as yet there is no such program.

Judging by everything, the oilfield workers hope to expand their beachhead on the Upper Kama by quiet, creeping tactics. They say that while the dispute goes on, new oil wells will be drilled. Afterwards, who will raise his hand to give the command to close them down! Isn't that why association General Director R. Khabibullin resisted in the extreme the newspaper's article on this topic?

"It calls attention to our work, it inflames passions, and it can provoke opposition to a matter of state importance," argued Raymer Khasanovich.

No, it is in the state's interests to assimilate the mineral riches of the Kama region with a wide sweep and in integrated fashion. The decisions of the 26th party congress, which are aimed at more complete use of all types of resources that are at the country's disposal, require this. It is not within the power, of course, of one department of a polytechnical institute to resolve all the problems connected with this and to develop a positive program for the long term. The matter must be placed on a solid scientific basis. And local feuds that arise because of a lack of an authoritative intermediary is still another confirmation of this.

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FUELS

AZERBAIJAN MEETING DISCUSSES PROGRESS IN SUPERDEEP DRILLING AT SAATLY

Baku VYSHKA in Russian 8 May 81 p 3

[Article by O. Nechipurenko (Saatly-Baku): "On to the Second Stage--Fully Armed"]

[Text] At the Saatly Superdeep Hole.

A day or two ago scientists from many cities of the country met at AzNIPIneft' [Azerbaijan State Scientific-Research and Design Institute of the Oil Industry] for a coordinating conference on the results of integrated research of the first stage and on tasks of the second stage of drilling of the superdeep Saatly hole.

The scientists listened with great attentiveness to the report of O. Ibragimov, chief of the Saatly Petroleum Exploration Expedition for Superdeep Drilling, about how the superdeep hole is being drilled, and about the rock specimens from it that they are studying carefully in their laboratories. It has passed beyond the 7,000 meter grade level, and the earth's resistance is becoming increasingly difficult to overcome. Advanced equipment will help: the quiet-running reduction-geared turbodrill, lightweight-alloy drill pipe and superhard bits developed by the All-Union Scientific-Research Institute for Drilling Technology.

The conference's participants also spoke about many deficiencies in the work of the Saatly workers to which serious attention must be devoted. Specialists of the Geological Institute of the Azerbaijan SSR Academy of Sciences noted that the current yield during drilling of the hole does not make it possible to evaluate accurately enough the rocks drilled through, to study their internal structure, and to classify the minerals correctly. In no way can it be considered normal that while 70 percent of all the meterage in 1979 was drilled with the withdrawal of rock samples, in 1980 the figure was only 20 percent.

Much criticism was expressed also against the organizations that participated in studying the Saatly well log. Many points described in the decision that was made up more than a year ago at the All-Union Coordinating Conference for this hole still have not been implemented. Not all the institutes--coworkers in the research--are presenting data about the results of the work done for the Saatly Oil-Exploration Expedition to the head institute--AzNIPIneft'--by the established deadline and in accordance with the appropriate GOST [State All-Union Standard] form. And this makes their practical use difficult.

There is still no information of any kind about boosting the work of scientific laboratories to create stable, heat-resistant drilling muds and equipment for cleaning them thoroughly. A place for the storage, repair and setting up of geophysical apparatus is still lacking.

It must be said that although almost half of the path to the 15-kilometer depth has been passed, only the standard complex of electrical measurement operations is yet being conducted. There is no apparatus for more thorough research, such as, for example, magnetometry and thermal, nuclear and neutron logging. Although, as conference participants noted, it would be possible to solve the problem partially by using geophysical equipment, which has already carried out its task at the Kola superdeep hole.

The main cause of the slow pace of introducing advanced geophysical methods of study of the hole, many speakers noted, is the lack of proper coordination and agreement on actions among the participants--AzVNIIgeofizika [Azerbaijan All-Union Scientific-Research Institute for Geophysics], Azneftegeofizika [Azerbaijan Trust for Petroleum Geophysics], and other participants.

The participants at the coordinating conference derived much that was of interest and useful from a trip to Saatly, where the superdeep hole is being drilled.

"For example, we worked out a new joint program for study of the occurrence of a number of rocks encountered in the hole's log," states Candidate of Geological-Mineralogical Sciences A. Ostroumova, who is from Leningrad. "The fervent interest, the desire to take part in this work, which expedition geologists A. Veliyev, Z. Gasanov, A. Mustafayev and others manifested, inspires assurance that it will be carried out successfully."

The second stage of drilling of the Saatly superdeep hole should be started at a depth of 7,500 meters. And by the end of the 11th Five-Year Plan it is planned to uncover the granitic layer of the earth's crust and to study the characteristics of its contacts with the basalt.

In order that this task may be resolved successfully, it is necessary to expand research work in every possible way, to raise its quality, and to provide for unconditional fulfillment of the measures planned.

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OIL WELLS, VINEYARDS ARE 'GOOD NEIGHBORS' IN GEORGIA

Tbilisi KOMUNISTI in Georgian 8 Apr 81 p 2

[Article by Gruzinform correspondent S. Svedlin: "Vineyards and Oil Are Good Neighbors"]

[Text] "Kakheti is now as well known for its oil as for its wine. In the 43 years since the oil wells went into operation, a great deal of high-quality liquid fuel has been extracted here," said Gruzneft' General Director, Hero of Socialist Labor R. N. Tevzadze.

The successes of Georgia's oil workers were mentioned at the 26th GCP Congress.

We asked what was being done to protect the environment against pollution and prevent damage to Kakheti's vineyards.

"From the first day of drilling," said R. Tevzadze, "Georgia's oil workers deal with environmental protection problems along with finding and extracting oil. There were many skeptics who feared that the close proximity of oil fields would hurt Kakheti's grape farmers. And there was one incident when an abandoned oil well suddenly 'came to life' and the black liquid covered the fields.... What the enraged grape growers and farmers didn't know was that the oil spouted all over the fields just because of a gross violation of elementary regulations governing the conduct of exploratory drilling operations. But in those years we were inexperienced. We were just learning petroleum science, and that was the only incident. Georgia's oil workers drew the right conclusions from that bitter lesson. Now, without stopping oil production and the exploration of new fields, they hermetically seal all wells that have been drilled out and deemed unpromising."

A multifaceted program of environmental protection is being implemented under the supervision and with the cooperation of the GSSR State Committee for Environmental Protection.

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FUELS

RELOCATION OF BATUMI OIL REFINERY URGED

Tbilisi KOMUNISTI in Georgian 24 Mar 81 p 2

[Article by Tbilisi State University docent Dr of Economic Sciences P. Lemondzhava: "Resolve It in an Integrated Fashion! Some Problems of Economic and Ecological Interaction at the Present Stage"]

[Text] At the present stage of the development of society, the interaction of economic and ecological processes has grown substantially. This has enabled us to view modern industrial production not as an independent process but rather a complex, unified ecological-economic system.

The environment is most adversely affected by harmful emissions of chemical substances in industrial enterprises. In the 19th century, this kind of environmental contamination extended only to areas adjacent to industrial cities. At the present stage, however, with the rapid growth of industrial production, it has become widespread. Chemical pollution especially disrupts the self-cleansing and self-restoring biological mechanism. As a result of chemical pollution, "dead spots" rapidly develop on water and soil surfaces. And such dead spots are unfit for use. Human life, being the highest product of the natural evolution of the biosphere, depends crucially on protecting the biosphere and preserving its resources.

The Communist Party and the Soviet government are constantly concerned for environmental protection and rehabilitation. Important normative documents have been passed in recent years, and the amount of funds allocated for such purposes has been growing. In the 10th Five-year Plan, for example, 11 billion rubles were allocated.

The main social cause of global environmental pollution is capitalism, capitalism's predatory exploitation of the environment to obtain maximum profits. Socialism has basically altered the relation between man and nature, placing all processes on a fundamentally new basis.

It is sufficient to note that the 25th and 26th CPSU congresses declared environmental protection and rehabilitation, the rational use of natural resources, to be one of the most crucial problems of our time. It is also worth noting that for the first time in the history of economic development a new section was included in the plan in accordance with a CPSU CC and USSR Council of Ministers decree and the decisions of the fourth session of the USSR Supreme Soviet Eighth Convocation: "Environmental Protection and Rational Utilization of Natural Resources." And the Basic Guidelines of Economic and Social Development of the USSR for 1981-85 and for the Period Through 1990 includes Section 9: "Environmental Protection." For some time to come, modern industry will continue to produce industrial wastes, which will, accordingly, continue to pollute the environment to some extent. But since natural systems have the ability to evolve, clean and restore themselves, our task is to see to it that the environmental pollution coefficient does not exceed the level beyond which natural systems lose the ability to cleanse themselves, undergo degradation and die. It is essential to determine permissible pollution norms scientifically, to work out "low-waste and waste-free technological processes" (as is stated in the Basic Guildelines) which will assure increased production output without violating ecological standards. It is possible to achieve this only on the basis of the harmonious development of economic and ecological systems.

There are many ways to combat environmental pollution. The most important way is to scrub harmful gas emissions from industrial and agricultural enterprises, although it must be acknowledged that this means has not been very effective so far because, first of all, it does not yield a fundamental resolution of the problem--scrubbing devices do not always completely prevent all harmful substances from escaping into the biosphere. Secondly, scrubbing devices are costly to build and take up a lot of space.

A more fundamental and economical way to protect the health of the environment is to develop new, perfected production technologies. The main thing is to develop waste-free technologies which make it possible to recover all substances harmful to the biosphere. So far, the use of this measure has not become widespread, because people think that the economic loss due to environmental pollution is less than the cost of developing such technologies. This view is mistaken, because pollution levels above permissible environmental norms increase human sickness, thus leading to increased work time losses and slower productivity growth, smaller farm crop yields, lower nutritional value of agricultural products, lower forest productivity, and poorer timber and wood quality. Environmental pollution does moral, esthetic, and other damage to society which is hard to measure economically, but it is essential to take it into account. The economic gain from eliminating environmental pollution losses, as a rule, is greater than the cost of preventing such pollution. Thus, environmental protection spending, in particular for the development and adoption of waste-free technologies, is also justified in terms of economics.

The modern scientific-technical revolution and its social-economic impact have made it objectively essential to plan economic-production activities on the basis of a systematic approach to the problem, with regard to management of economic and ecological processes. All measures designed to accelerate scientific-technical progress must be harmonized with the rational use of the environment. They must not be allowed to pollute the air and the water, to deplete the earth, and so on.

In our republic, the problem of protecting the air, the seas, rivers, and lakes has become a matter of great importance. There has been a 180-degree turnaround in this problem. Some 225 million rubles were spent for this purpose in the 10th Five-year Plan, and about 400 million will be spent in the 11th Five-year Plan.

For a complete solution to the problem of protecting and cleaning up the environment in Batumi, it seems advisable to us especially to move the oil refinery out of the city and the build a new one in Gardabani Rayon.

This move would be justified on other grounds as well. In particular, building an oil refinery in Gardabani would reduce the amount of rail transport in hauling the republic's oil products. Hauling a ton of oil products by rail costs three to four times more than by pipeline. Moreover, the oil refinery would be brought closer to the important new deposit discovered in the Samgori area, which could supply a substantial proportion of the refinery's crude requirements.

In territorial terms, the refinery would be nearby to the heaviest users of petroleum products: the Gardabani Rayon TETs, the Rustavi Metallurgy Plant and the Gardabani Ruberoid Plant, the Tbilisi and Gardabani petroleum depots, and the Tbilisi airport, which together account for over 50 percent of the republic's petroleum products consumption.

The hundreds of thousands of tons of refined products produced by the refinery annually could be delivered to the consumer by pipeline and automotive transport, thus reducing the product's prime cost. Transporting petroleum products by pipeline is one of the best ways to combat environmental pollution and reduce losses to the minimum.

In some of the republic's cities and rayon centers, efforts to improve technological processes in enterprises in order to reduce industrial emissions, dust levels, and harmful gases, build dust catching and scrubbing devices, and improve and rebuild existing scrubbing equipment are proceeding at too slow a pace.

With regard to natural resources, the rational use of the land is extremely vital. Careless neglect and improper use of the land cause erosion, high dust levels, and degradation, making thousands of hectares unfit for use. Despite measures that have been undertaken to protect Georgia's land resources and make rational use of them, we still have many shortcomings. Especially notable are existing shortcomings in the matter of land recultivation.

Georgia's Construction Materials, Local Industry, Construction, and Rural Construction ministries, Glavgruzvodstroy, Gruzneft', the Chiatura Manganese Combine, and other organizations have not been doing their land recultivation work on time. Wind and water erosion have done a lot of damage. These factors have caused much erosion on the Shiraki-Garedzhi Plateau. The soil is being eroded and depleted in other areas as well.

The structure and scale of industry in the republic's large cities have made especially urgent the matter of cleaning up the air. In this regard, the development of "green belts" is crucial. It is essential, above all, to improve the microclimate in every part of the city, to pay special attention to the choice of vegetation depending on the season, to the psychotherapeutic factor. Plant varieties must be chosen to resist dust, gas, and noise, while preserving an original style in city landscaping.

In this regard, much work has been done in Tbilisi. Last year more than 350,000 trees and shrubs and 668,000 flowers were planted in the city. Some 39 small parks and decorative corners were laid out, and lawns were planted on more than 136,000 square meters.

To clean up and protect the environment and make rational use of natural resources in general, it is essential to draw up a long-term integrated state program. Such a program must encompass all aspects of the problem. The correct handling of each one will require the working out of appropriate subprograms, especially social-economic, ecological, technological, educational, cultural-indoctrinational, international cooperative, and information-exchange measures. The development and implementation of such programs can promote the creation of a single nationwide system of environmental use planning and management which will ensure the rational choice of optimal variants of natural resource utilization and reproduction and determine permissible levels of environmental pollution. It is essential to work out means and methods of rational utilization and renewal of natural resources on the basis of the adoption of water-free and waste-free technologies, land reclamation, more complete wood processing, reforestation, and other innovations.

An urgent task facing Soviet scientists today is that of creating models of ecological-economic systems of optimal management of processes of environmental utilization. Such models must reflect current processes in both economic and ecological systems. The technique of looking at interrelationships enables us to make decisions which will ensure high production effectiveness in industrial technology while preventing damage to the environment.

Rational reconciliation of society's development program with the problem of protecting and developing ecological processes will ensure full harmony in the economic-ecological system.

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GEOLOGISTS CONTRIBUTE TO DISCOVERY OF FUEL

Moscow KRASNAYA ZVEZDA in Russian 5 Apr 81 p 4

/Article: "Mineral Wealth for the People"/

> /Text/ The role of the geological sector in the further expansion and strengthening of the mineral raw material base of the national economy of the country is great. From year to year Soviet geologists have been stepping up the pace of exploration and prospecting operations and have been developing hard to reach regions more and more actively. This has required the quickest possible introduction of the achievements of science and technology in geological practice. Not without reason is it indicated in the Main Directions of USSR Economic and Social Development for 1981-1985 and the Period to 1990: "To develop more rapidly advanced types of geophysical and geochemical studies of natural resources, to utilize extensively in geology the potentials of airborne high-altitude and space means of studying the natural resources of the earth...."
>
> Today is the Day of the Geologist. The prospectors of mineral resources are celebrating their occupational holiday under the conditions of an active drive for the implementation of the decisions of the 26th CPSU Congress.
>
> In recent years the technical equipment of the geological service has increased considerably. Heavy-duty mine drilling equipment, diverse geophysical apparatus, reliable vehicles, modern laboratory equipment and a substantial pool of computers have appeared. The published selection tells about what the labor of the prospectors of mineral resources looks like today and about the achievements of Soviet geologists.

New Stores of Gas Have Been Discovered

The collective of the Eastern Geological and Geophysical Expedition, which is searching for natural gas at the Dauletabad-Donmezskiy site in Karakumy, since the beginning of the year has increased the amount of prospecting work twofold. Several new formations of "blue" fuel have been discovered.

In the photos /photos not reproduced/: above--the leading brigade of the Eastern Geological and Geophysical Expedition (from left to right): M. Rozyyev, brigade leader V. Pogadayev, V. Nesterin and N. Linkevich; on the left--a drilling rig on one of the parcels of the deposit (TASS pictorial review).

Deep Exploration

In 1979 the tests of an automatic drilling rig, which makes it possible to sink a well to the depth of 4,200 m, were successfully completed. This complex set of machines, instruments and devices, including a high-speed computer, weighs about 1 000 tons. At such a rig there are half as many service personnel, while the drilling speed is 1.5-fold greater.

On the eve of the occupational holiday the Tyumen' geologists extracted for the first time in the Central Ob' River region a core--a rock sample--from a depth of more than 4,000 m. It has not yet been possible here to reach such horizons. The brigade of foreman N. Skryabin from the Pravdinsk Oil Prospecting Expedition drilled the record well.

The foreman himself drilled the final meters of the underground hole. Before the planned level the rate of penetration suddenly increased, it was as if the bit had fallen into a cavity: this is a true sign that a zone with a high formational pressure has been reached. The brigade honorably passed the test and "quieted" the well by using special equipment.

In all during the past five-year plan the collective of the Main Administration for Geology in the Tyumen' Region placed on the map more than 50 deposits. Deep drilling will make it possible to study better the structure of the deep horizons of the Siberian depths and to ensure the increase of the production of petroleum, gas and coal, which was outlined by the 26th CPSU Congress.

In the Region of Apsheron

In our times, of every 5 tons of petroleum produced in the world 1 ton is raised from under water. It has been determined that the reserves of "black" and "blue" gold, which are held in the shelf--the littoral part of seas and oceans--exceed by twofold the amounts of the continental deposits.

Externally the ship, which for 2 months now has been "dragging" the Caspian in the region of Apsheron, differs in almost no way from conventional motorships. But a long band--a so-called seismic braid--stretches beyond its stern instead of a foamy train.

By means of a system of special pickups this device receives, records and transmits on board the seismic oscillations of the bottom, which were caused artifically by geophysicists. The battery of air guns installed on board the ship "Suleyman Bagirov" fires a "volley" over the section of the sea bottom, which is being studied.

"The instruments report on the geological structure of the depths of the Apsheron rise," expedition chief I. Guseynov says. "The gigantic underwater connecting strip, which extends from the pile-supported field of Neftyanyye Kamni to the

Turkish shore of the Caspian, long ago attracted the attention of prospectors of mineral resources. However, due to the depth of the water, which here reaches up to 100 m, several years ago the drilling of wells on the Apsheron rise was a matter of the distant future. New technology has opened the way to the solution of this problem as well during the current five-year plan."

In Flight Over the Mountains

Airborne high-altitude methods are playing an ever increasing role in the geological study of natural resources. Improved instruments, which are installed on board airplanes and helicopters, are promoting this.

As soon as the sun rises over the peaks of Udokan, an An-2 airplane takes off from Chara. V. Potapov, an expert of northern routes, pilots it. The crew has a difficult flight line--over the peaked Kodar range.

A special device--a nuclear airborne magnetometer--has been installed on board the airplane. By means of it the geophysicists are seeking minerals in the zone of the Baykal-Amur Railway Line, which is under construction.

The tape of the instrument records the composition of the earth's crust. The pilot has difficulty at this time. He must fly no higher than 150 m above the ground. And this is under the conditions of the high mountains of Northern Trans-Baykal.

After an anomaly is detected from the air, a landing party of geologists and geophysicists is landed at it, then they carry out detailed prospecting on this site.

The collective of the airborne geophysics party of the Chitageologiya Association has discovered in the regions adjacent to the Baykal-Amur Railway Line several mineral deposits, helicopter pilots V. Pogorelov and V. Moskvitin have given the geologists much assistance. They fly the craft at an altitude of not more than 75 m, following the topography of the mountains.

According to Space Maps

Space photography is helping to better understand the regularities and peculiarities of the structure of the earth's crust and, as a consequence, the location of underground stores. It is estimated that a 5-percent increase of the rate of geological prospecting in the search for petroleum and gas provides a gain of nearly 2 billion rubles.

Maps are developing today from space photographs. Such is the Space Techtonic Map of the East European Platform. It has already been turned over to the All-Union Geological Funds. Every geologist finds much of use in it. From it, for example, it is evident that the famous Caspian basin is nearly twice as large as was previously believed.

It turned out that the underground salt domes (petroleum and gas often accumulate in them), which are clearly distinguished in the space photographs, are not randomly distributed over the entire area of the basin, but are arranged in a specific order. Thus new regions, which are promising for geological research, for example, in Vitebskaya and Smolenskaya Oblasts and in the Pechora basin of the Komi ASSR, were discovered on the map. And recently the first tons of petroleum were produced in these places.

The space map, which was discussed, is far from the only one of its kind. Quite recently a geological map of Western Siberia was prepared and was awarded a Gold Medal of the Exhibition of USSR National Economic Achievements.

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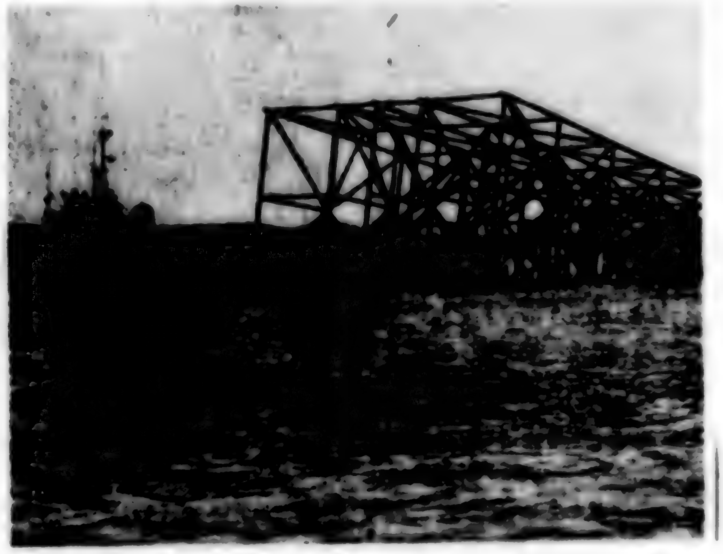
FUELS

CASPIAN OFFSHORE PLATFORM CONSTRUCTION BEGINS

Moscow PRAVDA in Russian 21 Mar 81 p 1

[Text] Baku, 20 Mar (TASS)--A gigantic block of the first metal island, which will be erected on a section of the Caspian, where the depth of the water reaches 120 m, has been put into the water. A platform, which will be erected in the open sea at the promising Petroleum Deposit imeni 28 aprelya, will consist of two such platforms. Two derricks will be erected here, and two brigades will simultaneously drill two wells.



Caption: The transportation of the block.

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FUELS

BRIEFS

DONBASS COAL RESERVES--Donetsk (TASS)--The Donbass, which has already given the country enormous coal resources, continues to reveal newer and newer stores. The driving of the last of the four shafts of the Yuzhnodonbasskaya No 3 Mine, which is being built and the capacity of which is 2.4 million tons of coal a year, has been completed here. The total coal reserves of the Southern Donbass, which were proved during the postwar years, are approaching 2 billion tons. The proximity of the fuel, which is suitable for coking, to the users--the metallurgical enterprises of Donetsk and Zhdanov--is creating favorable conditions for the development of a new industrial region. According to preliminary estimates, it is possible to build here about 10 large mines with a life of 60-70 years. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 24 Mar 81 p 2] 7807

NEW SIBERIAN CITY--The construction of the new city of Noyabr'sk, where oil workers, geologists and construction workers will settle, has begun on the cold earth of Yamal. From here the Siberians will develop remote deposits. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 13, Mar 81 p 3] 7807

MUBAREK GAS TREATMENT PLANT--The installations of the third section of one of the largest gas treatment plants of the country--the Murabek plant in Uzbekistan--have begun to operate. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 13, Mar 81 p 3] 7807

YAKUT GAS DISCOVERIES--Yakutsk--Two new gas deposits have been placed on the geological map of Yakutia. The great promise of the Taas-Yuryakhskiy and Verkhne-Lindenskiy sites has been confirmed. They have been prepared for deep drilling. The first exploratory wells yielded a commercial flow of gas. [Text] [Moscow IZVESTIYA in Russian 8 Mar 81 p 6] 7807

TURKMEN GAS SUPPLY--With the completion of the installation of gas facilities in Cheleken natural gas has been fed to the housing tract of Karagel', where all the houses have been connected to the centralized gas supply system. Now in Turkmenia 98 percent of the population is supplied with natural and liquified gas. Such large industrial centers as Ashkhabad and Chardzhou have been completely provided with gas facilities. [Text] [Moscow PRADVA in Russian 15 Mar 81 p 3] 7807

KIRISHI GASOLINE--Leningrad--The first thousands of tons of high octane gasoline have been obtained at the new heavy-duty reforming in the Kirishinefteorgsintez Association. The gasoline meets all the requirements of the All-Union State Standard. Its use will make it possible to increase the operating reliability of motor transport and will provide a large economic impact. The adjustment work is now being completed at the installation. The collective of the association has decided to bring it up to the total rated capacity 2 months ahead of the deadline. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 21 Apr 81 p 1] 7807

SPORTS COMPLEX AT GRES--Mingechaur--The settlement of the construction workers of the Azerbaydzhanskaya GRES is more and more clearly assuming the traits of a modern urban rayon. Now multistory apartment houses with comfortable apartments, numerous cultural and personal facilities, schools, kindergartens and a polyclinic constitute the basis of the housing tract here. And at the end of last year the construction of a new sports complex was begun, with whose placement into operation the opportunities for the organization of mass physical cultural work among the population at the place of resident will be increased. This facility is considered to be one of the main ones and will be built at a stepped-up pace. Playing fields, track and field sectors, a gymnasium, a stadium with stands for 3,000 spectators and a 25-m swimming pool are envisaged here. Premises for service personnel, the auxiliary and technical services and the methods offices will be located on the first floor in the main building, while the second floor will be set aside for a sports hall, the useful area of which will be 540 m^2. It seems that with the placement of this structure into operation the sports indicators of the construction workers of the GRES will be just as significant as the production indicators. Although it should be noted that the teams of construction workers are participating in all the matches being held by the sports committee of Mingechaur and are invariably successful. [By E. Yusifov] [Text] [Baku VYSHKA in Russian 1 Apr 81 p 4] 7807

OIL WELL OVERHAULING--Ali-Bayramly--About 7,000 tons of additional fuel were extracted this year from the earth's interior as a result of the shock work of the collective of the shop of the major overhaul of wells of the Shirvanneft' Petroleum and Gas Production Administration. The overhaulers reported almost a week ahead of the deadline the fulfillment of the assignment of the quarter, having restored 108 wells instead of 106 in accordance with the plan. They overhauled 27 wells with a total speed up of 408 hr as against the schedule, which made it possible to save 7,000 rubles of state assets. The great skill of the workers helped the leading brigades, among which are the collectives headed by foremen A. Iskenderov, A. Abdullayev, S. Radzhabov and E. Veliyev, to achieve success. Responding by deed to the decree of the CPSU Central Committee, the USSR Council of Ministers, the AUCCTU and the Komsomol Central Committee on the All-Union Socialist Competition for the Successful Fulfillment and Exceeding of the Assignments of the 11th Five-Year Plan, the workers of the shop are now assuming new, higher obligations. It was decided in addition to turn over to the operators another four wells which have been overhauled in excess of the plan. [By A. Babayev] [Text] [Baku VYSHKA in Russian 1 Apr 81 p 1] 7807

OIL WELL DRILLING--About 100 tons of "black gold" arrive every day at the tanks of the Sal'yanyneft' Petroleum and Gas Production Administration from the 3 wells drilled this year by the collective of the Kyursanginskiy Administration of Drilling Operations. Moreover, one of them was put into operation in excess of the assignment. Inspired by the awarding to the Azerbaijan SSR for the 11th year in a row of the Challenge Rad Banner of the CPSU Central Committee, the USSR Council of Ministers, the AUCCTU and the Komsomol Central Committee, the collective of drillers reported 5 days ahead of the deadline the completion of the quarterly program. Already 18,592 m of rock have been drilled, 250 m more than planned. At the same time the plan of exploratory drilling was exceeded by more than 700 m. Good indicators were also achieved in the rate of drilling, which considerably exceeded the planned rate and is 464.7 m per rig a month. Labor productivity increased by 15.7 percent as against the assignment. The cost per meter of drilling was reduced. The gains were made primarily due to the shock, trouble-free work of the drilling brigades headed by foremen S. Mamedov, who was awarded the Order of Lenin for great labor achievements in 1980 and during the 10th Five-Year Plan as a whole, N. Nagiyev, A. Gasanov and B. Shiraliyev. The drillers greeted with ardent approval the decree of the CPSU Central Committee, the USSR Council of Ministers, the AUCCTU and the Komsomol Central Committee, "On the All-Union Socialist Competition for the Successful Fulfillment and Exceeding of the Assignments of the 11th Five-Year Plan." A search for new reserves to increase labor productivity, to accelerate the rate of the drilling of wells and to reduce expenditures has been launched in all the brigades. [By I. Makhmudov] [Text] [Baku VYSHKA in Russian 1 Apr 81 p 1] 7807

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July 30, 1981